

Detailed Elemental Abundances in the M31 Stellar Halo: Low-Resolution Resolved Stellar Spectroscopy

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The stellar halo and tidal streams of M31 provide an essential counterpoint to the same structures around the Galaxy. While Galactic measurements of $[\text{Fe}/\text{H}]$ and $[\alpha/\text{Fe}]$ have been made, little is known about the detailed chemical abundances of the M31 system. To make progress with existing telescopes, we apply spectral synthesis to low-resolution spectroscopy ($R \sim 2500$ at 7000 Angstroms) across a wide spectral range ($4500 < \lambda < 9100$ Angstroms). We have obtained deep spectra of red giant branch stars (RGB) in the tidal streams and smooth halo of M31 using the DEIMOS 600ZD grating, resulting in higher signal-to-noise per spectral resolution element ($S/N \sim 30 \text{ Angstrom}^{-1}$). By applying our technique to RGB stars in Galactic globular clusters with existing measurements from higher-resolution spectroscopy, we demonstrate that our technique reproduces previous measurements derived from higher resolution spectra over a more limited spectral range (6300 - 9100 Angstroms) using the DEIMOS 1200G grating. For the first time, we present measurements of $[\text{Fe}/\text{H}]$ and $[\alpha/\text{Fe}]$ of sufficient quality and sample size to construct quantitative models of galactic chemical evolution in the M31 system. We also discuss this work in the context of future Subaru/PFS spectra in M31's stellar halo.

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Talk/Poster

Talk

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