

Abstract Submitted  
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**Analyzing an Unusual Population of Weak CN Stars in the Disk of the Andromeda Galaxy (M31)** ARYA MAHESHWARI, The Harker School, San Jose, CA, ALEXANDRA MASEGIAN, The University of Chicago, PURAGRA GUHATHAKURTA, AMANDA QUIRK, RACHEL RAIKAR, CAELUM RODRIGUEZ, University of California, Santa Cruz, ANTARA BHATTACHARYA, Navy Children School, Mumbai, Maharashtra, ANIKA KAMATH, Massachusetts Institute of Technology — The recent discovery of a population of weak CN AGB stars in the disk of the Andromeda Galaxy (M31) has raised new questions about how massive stars evolve. This population is characterized by its unconventional mix of carbon- and oxygen-based spectral features, the most prominent of which is a weak double-peaked CN absorption line at around 8000 Angstrom. We present a sample of these weak CN stars identified from an analysis of the Spectroscopic and Photometric Landscape of Andromeda’s Stellar Halo (SPLASH) and the Panchromatic Hubble Andromeda Treasury (PHAT) surveys. Our sample was constructed via an automated classification algorithm that compared candidate stars to coadded spectral templates of visually-identified weak CN and carbon stars. Each star was assigned a score based on this comparison, quantifying its similarity to a weak CN model population. Results from this spectroscopic pipeline and analysis of candidate stars in color-magnitude space, as well as comparisons to stellar track models, suggest that weak CN stars may represent a phase of stellar evolution that is entirely distinct from the carbon-rich phase previously studied in AGB stars. We propose that further investigation into these unusual stars could lead to a better understanding of massive evolved stars.

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