# Analyzing Captured Spectroscopic Data From Altair, Vega, and Mirach: Implications for Stellar Classifications and Characteristics

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Stellar spectroscopy is vital in astronomy, enabling star classification, chemical analysis, and more. The Harvard Classification System, classifies stars into temperature (O, B, A, F, G, K, M), helping scientists determine a star's properties and lifespan. My goal was to understand how the spectra of stars can be used to determine their chemical composition, classify them into the Harvard classification system, and see what this classification can imply for similar stars. Using a telescope, tracking mount, capturing software, star analyzer (200 l/mm diffraction grating), and more, I captured the spectra of Altair, Vega, and Mirach. RSpec software allowed me to view the stars' spectra as spectral energy distributions and compare them to known NIST sources. The peak of Altair and Vega's spectra indicated higher wavelengths and energy, suggesting relatively high temperatures (7,500–10,000 K). These spectra had strong absorption features at 6560 Angstroms, 4860 Angstroms, 4340 Angstroms, and 4100 Angstroms corresponding to the Hydrogen Balmer series, leading me to classify them as A-type stars. The peak of Mirach's spectrum indicated lower wavelengths and energy, suggesting a lower temperature (around 2,500–3,500 K). Ten absorption lines between 4700 Angstroms and 7700 Angstroms aligning with Titanium Oxide (TiO) bands, confirmed its classification as an M-type star. Identifying stars helps us understand their traits, such as A-type stars having shorter lifespans and more radiation, while G and K-type stars are ideal for life search. This classification is vital for understanding critical insights into the conditions for life beyond Earth.

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