

## Spectroscopic diagnostics in astronomy and astrophysics

The discrete energy levels of particles lead to preferred wavelengths for the emission or absorption of light: the spectral lines. The relative strengths, the positions, the widths, the shape of spectral lines have taught us much of what we know about the physical nature of stars and interstellar matter. They give us access to gas temperature, density and pressure, and to a measure of the velocities of cosmic objects with respect to Earth. Line profiles are also sensitive to interactions between particles. And by comparing the spectra of nearby and remote objects, we can test whether some of the constants of physics are really constant on cosmic timescales.

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