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Atomic astrophysics for Galactic evolution

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The chemical composition of a star provides information about the environment in which it was born. This, in turn, makes it possible to study the formation and evolution of our Galaxy. Reliable abundance analysis of various elements in stellar spectra require an understanding of the atomic nature, in the form of accurate atomic transition data. By combining radiative lifetimes with relative emission line ratios, so called branching fractions, from Fourier Transform Spectroscopy measurements, we can derive oscillator strengths for astronomically important transitions.
We present our current project of astronomical relevance: the spectrum of neutral aluminium, Al I. Aluminium is specifically found in young, massive stars, which makes it a key element for mapping out ongoing nucleosynthesis throughout the Galaxy. Comparing experiment to theoretical calculations helps confirm and further improve atomic structure codes. The combination of these two methods, in turn, allows for an even more accurate stellar abundance analysis, as well as a better understanding of the atomic structure.

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