

WHAT CAN PLASMA SPECTROSCOPY DO FOR ASTRONOMERS? MEASURING ATOMIC PARAMETERS OF ASTROPHYSICAL IMPORTANCE

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Abstract. Plasma spectroscopy is a powerful tool that allows us to measure atomic parameters needed by astronomers such as transition probabilities, wavelengths, energy levels, hyperfine structure constants or Stark parameters. Access to high-quality atomic data allows astronomers to analyse astrophysical spectra and extract information from the shapes, widths and shifts of the spectral lines emitted by atoms and ions. Knowledge, not only of chemical composition but also of temperatures and electron densities of the astrophysical plasmas, can thus be obtained. However, a great quantity of the atomic data needed for spectra interpretation is yet to be measured.

The Atomic Spectroscopy Laboratory at the University of Valladolid (Spain) has a long history working in the generation, diagnostics and measurement of plasma spectra in the ultraviolet and visible spectral ranges. We collaborate with the Fourier Transform Spectroscopy Laboratory at Imperial College London (United Kingdom), the spectroscopy laboratory at NIST (USA) and the University of Lund (Sweden) to extend our measurements to the vacuum ultraviolet and the infrared regions with resolving powers of up to 2 000 000 at 200 nm.

In this talk, I will discuss in a comprehensive manner the different methods used by the aforementioned laboratories in the accurate measurement of atomic parameters of neutral and ionised species, providing examples of the latest results. The aim of this contribution is to explain the current capabilities of these laboratories to the plasma community with the intention of fostering interaction and new collaborations with those fields of research and industry in need of high-quality atomic data.

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