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[Plenary Invited Lectures]

On the Stark broadening of spectral lines of ionized copper

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Abstract: Atomic data are of great importance for modelling and investigations of different plasmas in astronomy, laboratory and technology. In particular, Stark broadening data or data on widths and shifts of spectral lines broadened by collisions with charged particles are needed in a number of different topics, like in astrophysics, for inertial fusion experiments, laser design and development, laser-produced plasma research, different plasmas in technology and industry etc. Stark broadening data for lines of onized copper are needed for example for diagnostics, spectral analysis, modelling and optimization of laser-produced plasma in front of copper target in photon and ion irradiation of metal nanoparticles and other copper-based experiments involving plasma. Such data are of interest also e.g. for stellar abundance determination, stellar atmosphere modelling etc., since Cu ines have been observed in spectra of various stellar types. Recently, electron-impact (Stark) full widths at half intensity maximum for 22 spectral lines of singly charged copper ion (Cu II) have been calculated (Dimitrijević, 2024) by using the modified semiempirical method (Dimitrijević and Konjević, 1980, see also Dimitrijević, 2020). The calculations have been performed for an electron density of 10^{17} cm^{-3} and for a temperature range from 5 000 K up to 80 000 K.

The obtained results, have been used to demonstrate similarities and regularities of Stark widths of Cu II spectral lines within a multiplet, a supermultiplet and a transition array. The obtained results have also been compared with the results of experiments and other theoretical data. Here, we will present the corresponding article (Dimitrijević, 2022) and the obtained results.

Keywords: Stark broadening, Cu II, line profiles, atomic data, atomic processes

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