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ON THE STARK BROADENING PARAMETERS FOR Cu III AND Zn III LINES IN A TYPE STAR ATMOSPHERES

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Stark broadening of ion and atom lines is of interest in the investigation of laboratory and astrophysical plasma. With the development of space-born spectroscopy, observations of spectral lines of trace elements like copper and zinc, become available. From the analysis of 11 Hg-Mn star spectra (Jacobs and Dworetsky, 1981) for example, it follows that copper is clearly overabundant in 10 of investigated stars. Zinc spectral lines are present as well in stellar spectra (see e.g. Adelman 1994, Cowley et al. 2000, Ryabchikova et al. 2000).

The knowledge of Stark broadening parameters is also of interest for the investigation of laboratory and technological plasmas. For example, Spectral lines of Cu III and Cu IV are of particular interest for the diagnostic and modelling of plasma created in electromagnetic macro particle accelerators where in experimental work, the plasma is usually created by Cu or Al foil evaporation. Also, doubly charged zinc ion is a member of the nickel isoelectronic sequence, known to include possible candidates for development of ultraviolet lasers.

Here we present Stark widths for six transitions of Cu III and six transitions of Zn III calaculated by using the modified semiempirical approach (Dimitrijevi and Konjevi 1980). Obtained theoretical results are used to consider the influence of Stark broadening for A type star atmospheres conditions.

Obtained results demonstrate that in A type star atmospheres exist layers where the influence of Stark broadening on Cu III and Zn III line shapes is important in comparison with Doppler broadening. The obtained Stark broadening parameters contribute also to the creation of a set of such data for as large as possible number of spectral lines, of significance for a number of problems in laboratory, technological and astrophysical plasma research.

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