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ASTROPHYSICAL APPLICATIONS OF STARK BROADENING OF SPECTRAL LINES

M. D. CHRISTOVA[1], MILAN S. DIMITRIJEVIĆ[2,3] and S. SAHAL-BRÉCHOT[3]

[1]*Department of Applied Physics, Technical University of Sofia, 1000 Sofia, Bulgaria*
E-mail mchristo@tu-sofia.bg

[2]*Astronomical Observatory, Volgina 7, 11060 Belgrade, Serbia*
E-mail mdimitrijevic@aob.rs

[3]*LERMA, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université, F-92190 Meudon, France*
E-mail sylvie.sahal-brechot@obspm.fr

Abstract. Stark broadening data (data for spectral line broadening due to interactions of emitters with charged particles) are of interest in many research topics as astrophysical plasma, laboratory plasma diagnostics, fusion plasma, laser induced plasma and for various plasmas in technology and industry.

In this contribution will be presented an overview of our new and recently obtained calculated results for Stark width and shift of spectral lines of B I, Zn II, Si II, Ga II, Fe XXV, N II, N VI, and Sn II. Semiclassical perturbation theory in collisional approach created by Sahal-Bréchot and developed further (Sahal-Bréchot, Dimitrijević and Ben Nessib, 2014 and references therein) is applied. Plasma conditions of interest cover a wide range of temperatures and particle densities, and they are applicable for the interpretation and analysis of stellar spectra. For the chemical elements Zn III, Al IV and Lu II atomic data are missed and the modified semi-empirical method (MSE) is used where the spectral line broadening is due to electrons. A demonstration of Stark broadening influence on the spectral lines in stellar spectra is presented.

References

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