

REGULARITIES AND IRREGULARITIES OF THE STARK PARAMETERS FOR SINGLE IONIZED NOBLE GASES

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Abstract. Spectroscopy of ionized noble gases has a great importance for the laboratory and astrophysical plasmas. Generally, spectra of inert gases are important for many physics areas, for example laser physics, fusion diagnostics, photoelectron spectroscopy, collision physics, astrophysics etc. Stark halfwidths as well as shifts of spectral lines are usually employed for plasma diagnostic purposes. For example atomic data of argon krypton and xenon will be useful for the spectral diagnostic of ITER. In addition, the software used for stellar atmosphere simulation like TMAP, and SMART require a large amount of atomic and spectroscopic data. Availability of these parameters will be useful for a further development of stellar atmosphere and evolution models. Stark parameters data of spectral lines can also be useful for verification of theoretical calculations and investigation of regularities and systematic trends of these parameters within a multiplet, supermultiplet or transition array.

In the last years, different trends and regularities of Stark parameters (halfwidths and shifts of spectral lines) have been analyzed. The conditions related with atomic structure of the element as well as plasma conditions are responsible for regular or irregular behaviors of the Stark parameters. The absence of very close perturbing levels makes Ne II as a good candidate for analysis of the regularities. Other two considered elements Kr II and Xe II with complex spectra present strong perturbations and in some cases an irregularities in Stark parameters appear. In this work we analyze the influence of the perturbations to Stark parameters within the multiplets.