On the Stark broadening parameters of N VI spectral lines

Magdalena D. Christova[1], Milan S. Dimitrijević[2,3] and Sylvie Sahal-Bréchot[3]

[1]Department of Applied Physics, Technical University-Sofia, 1000 Sofia, Bulgaria
E-mail: mchristo@tu-sofia.bg
[2]Astronomical Observatory, Volgina 7, 11060 Belgrade, Serbia
E-mail: mdimitrijevic@ipb.ac.rs
[3]LERMA, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université,
5 Place Jules Janssen, 92190 Meudon, France

Stark broadening data, or data for broadening by collisions with charged particles, are of interest in many research topics. They are particularly needed for astrophysical plasma research, but also for laboratory plasma diagnostics, for fusion plasma, laser research and for various plasmas in technology.

Data for Stark broadening of five times charged nitrogen ion (N VI) spectral lines are important particularly for investigation of white dwarfs where N VI lines are present (see e.g. Rauch 2007) and Stark broadening is the dominant pressure broadening mechanism. Reliable data for Stark broadening of N VI are also of interest for proton-boron fusion plasma since in a number of investigations (see e,g, Margarone et al. 2014, Giuffrida et al. 2020, Istokskaia et al. 2023) the target is boron nitride (BN).

Using the semiclassical perturbation theory (see Sahal-Bréchot, Dimitrijević and Ben Nessib, 2014 and references therein), we calculated Stark widths and shifts, determining line profile, for 15 multiplets containing 33 spectral lines of N VI broadened by collisions with the most important charged constituents of stellar and proton-boron fusion plasma: electrons, protons, alpha particles, B III, B IV, B V and B VI ions. Calculations have been performed for a grid of temperatures and perturber densities. The obtained results will be also prepared in VO (Virtual Observatory) and XSAMS (XML Schema for Atomic, Molecular and Solid Data) format for the implementation of results in the international, on-line database STARK-B (Sahal-Bréchot et al. 2015 - https://stark-b.obspm.fr/) a part of VAMDC (Virtual Atomic and Molecular Data Center, Dubernet et al., 2010 - https://portal.vamdc.org/vamdc_portal/home.seam), after the publication of the main article.

In this contribution we will present and discuss a part of results which will be published in entirety elsewhere (Dimitrijević, Christova and Sahal-Bréchot 2023).

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