

QUANTUM AND SEMICLASSICAL STARK WIDTHS OF Ar VII SPECTRAL LINES

R. Aloui¹, H. Elabidi^{2,3}, S. Sahal-Bréchet⁴ and M. S. Dimitrijević^{4,5}

¹*GRePAA, École Nationale Supérieure d'ingénieurs de Tunis,
University of Tunis, Tunisia*

²*GRePAA, Faculté des Sciences de Bizerte, University of Carthage, Tunisia*

³*Deanship of Preparatory Year, Umm Al-Qura University, Makkah, KSA*

⁴*LERMA, Observatoire de Paris, 5 Place Jules Janssen, 92195 Meudon Cedex, France*

⁵*Astronomical Observatory, Volgina 7, 11060 Belgrade 38, Serbia*

E-mail:haelabidi@uqu.edu.sa

Among the ions of astrophysical interests, the argon is very important, where far UV lines of Ar VII for example have been recently discovered in the spectra of very hot central stars of planetary nebulae and in (pre-) white dwarfs (Werner et al. 2007). The authors have showed the importance of the line broadening data for this element in its various ionization stages in the diagnostic and modelling. Argon has also an important role in plasma technological applications and devices (Djurović et al. 2011). We have performed Stark broadening calculations for some spectral lines of Ar VII. To the best of our knowledge, there are no results of Stark broadening for this ion. We present our results in a temperature range from 10^4 K to 10^6 K. We present also electron impact excitation collision strengths for Ar VII levels.

We use in the present work the quantum and semiclassical approaches. The quantum mechanical expression for electron impact broadening calculations for intermediate coupling was obtained in Elabidi et al. (2004). This approach has been applied many times (Elabidi et al. 2007, 2008a, 2008b, 2009). It has been also used in Elabidi and Sahal-Bréchet (2011) to check the dependence on the upper level ionization potential of electron impact widths, and in Elabidi et al. (2014) to investigate the influence of strong collisions and quadrupolar potential contributions on line broadening. In the semiclassical method (Sahal-Bréchet 1969a,b), the atomic data have been taken from the code SUPERSTRUCTURE of Eissner et al. (1974). We have made a comparison between our quantum and semiclassical results.

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