VII SERBIAN CONFERENCE ON SPECTRAL LINE SHAPES IN ASTROPHYSICS
15-19 June 2009, Zrenjanin, Serbia
Book of Abstracts, Eds. L. Č. Popović, M. S. Dimitrijević, D. Jevremović and D. Ilić
Serbian Astronomical Society and Astronomical Observatory, Belgrade, 2009

Poster

SEMI CLASSICAL IMPACT STARK BROADENING OF COMPLEX TRANSITIONS IN FeXIV

Walid Foued Mahmoudi[1], Nebil Ben Nessib[2] and Sylvie Sahal-Bréchot[3]

[1] *Groupe de Recherche en Physique Atomique et Astrophysique, Faculté des Sciences de Bizerte, 7021 Zarzouna, Tunisia*
E-mail: walidfoued@yahoo.fr

[2] *Groupe de Recherche en Physique Atomique et Astrophysique, Institut National des Sciences Appliquées et de Technologie, Centre Urbain Nord B. P. No. 676, 1080 Tunis Cedex, Tunisia*
E-mail: nebil.bennessib@planet.tn

[3] *Laboratoire d'Etude du Rayonnement et de la Matière en Astrophysique, Observatoire de Paris, Section de Meudon, UMR CNRS 8112, Bâtiment 18, 5 Place Jules Janssen, F-92195 Meudon Cedex, France*
E-mail: Sylvie.Sahal-Brechot@obspm.fr

Using the semi-classical approach by Sahal-Bréchot, including both dipole and quadrupole contribution in the expansion of the electrostatic interaction between the optical electron and the perturber, and the new diagonal multiplet factor formulae for more complicated configurations such as $(n_1 l_1^n(L_n S_n)\ n_2\, l_2^m(L_m S_m)\ \ n_3 l_3^p(L_p S_p))$, in LS coupling, calculated by Mahmoudi et al., we have calculated Stark broadening widths of Fe XIV, such as ($n_1 p n_2 d n_3 f$, $n_1 p n_2 d n_3 d$, $n_1 s n_2 d n_3 p$, $n_1 p n_2 d n_3 s$, $n_1 s n_2 p n_3 d$...), in order to test the applied method and the accuracy of the obtained results, for interpreting the new data.

In fact Stark broadening impact theory data are needed to solve various problems in astrophysics and physics. Fe XIV is especially important due to its presence in stellar envelopes, and Stark broadening plays a role in the stellar structure and evolution calculations (Alecian et al., 1993).

The aim of this work is twofold. To provide new Stark broadening data for astrophysically important FeXIV lines and to test the the new diagonal multiplet factor formulae for complicated configurations in the semi-classical approach for multicharged atoms. Therefore new Stark width values (experimental and other theoretical results in particular quantum mechanical ones) would be welcome to check our results.

References

Alecian, G., Michaud, G., Tully, J.: 1993, *ApJ*, **411**, 882.