Abstract number: I14
Invited

Line shape modeling for the characterization of stellar atmospheres, magnetic fusion and magneto-inertial fusion experiments, and corona discharges

Rosato J.[†1], **Bonifaci N.**[2], **Calisti A.**[1], **Ferri S.**[1], **Hannachi I.**[1], **Marandet Y.**[1], **Stamm R.**[1]
[1] *Aix-Marseille-Université, CNRS, PIIM, Campus de Saint-Jérôme, F-13397 Marseille Cedex 20, France*
[2] *Université Grenoble Alpes, CNRS, Grenoble INP, G2ELab, 21 avenue des martyrs, F-38031 Grenoble Cedex 1, France*

[†]joel.rosato@univ-amu.fr

A selection of problems related to the modeling of Stark broadening is considered, for astrophysical and laboratory plasma diagnostic applications. At the atomic level, a proper description of a line shape requires the ion microfield evolution be accounted for during the time of interest of the transition under consideration; this is the so-called ion dynamics issue. In addition, the lines presenting a structure such as Hβ can exhibit an asymmetry due to presence of multipolar interactions, which is significant at high density regimes and must be retained in calculations. Some observed spectra from magnetized plasmas also exhibit lines with a Zeeman triplet structure due to both linear and quadratic terms in the Hamiltonian, which must also be retained in calculations. We give a review of these problems and present new spectra calculations. A focus is put on plasma conditions relevant to stellar atmospheres, magnetic fusion experiments, magneto-inertial fusion experiments, and dedicated corona discharges carried out in laboratory. Features that are common to each of these plasmas (e.g., the plasmas can have the same electron density range) are discussed. We present calculations and also report on line shape fittings which have been performed for diagnostic applications.