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[Lecture]

Non-typical Spectral Line Shapes from Laboratory Plasma of Interest for Astrophysics

Nikola Cvetanović^{1*} and Bratislav M. Obradović²

¹University of Belgrade, Faculty of Transport and Traffic Engineering, Belgrade, Serbia

² University of Belgrade, Faculty of Physics, Belgrade, Serbia

*Correspondence: nikola@ff.bg.ac.rs

Abstract: Spectral line shapes are a powerful diagnostic tool for investigating both laboratory and astrophysical plasma. Typical applications include determination of plasma parameters and the strength of the electric or magnetic field. However, in certain cases atypical line shapes occur that cannot be explained using standard models for the line-profile analysis e.g. Doppler or pressure line broadening. To perform the line analysis in such cases, new and advanced fitting procedures must be developed, often paired with imaging and backed up by wider theoretical framework to take in to account the specific processes at play. The physical mechanisms that cause such line-shape effects in laboratory plasma are often similar or analogous to those in astrophysical plasma. Therefore, the methods can be seen as a link between the laboratory plasma formed in controlled experiments and the investigation of astrophysical objects.

Keywords: plasma, spectral line shape, experiment