On The Gas Temperature Determination in Atmospheric Pressure Surface Wave Discharges Sustained in Rare Gases, Using Van Der Waals Broadening

J. Muñoz[1], C. Yubero[1], M. S. Dimitrijević[2,3] & M. D. Calzada[1]

[1]*Grupo de Espectroscopía de Plasmas, Edificio Einstein (C-2), planta baja, Campus de Rabanales. Universidad de Côrdoba, 14071 Côrdoba, Spain*

[2]*Astronomical Observatory, Volgina 7, 11060 Belgrade 38, Serbia*

[3]*Observatoire de Paris, 92195 Meudon Cedex, France*

e-mail: f72muesj@uco.es, mdimitrijevic@aob.bg.ac.yu, md.calzada@uco.es

Abstract

In order to investigate heavy particle kinetics in atmospheric pressure surface wave sustained discharges, one needs to determine gas temperature. Since the values of line width due to van der Waals broadening can be easily related by means of the Lindholm-Foley theory to that of the gas temperature, the research on this broadening mechanism has become one of the most important issues in recent spectroscopy studies.

This contribution tries to determine the most suitable lines for measuring gas temperatures, by investigating the profiles of several rare gas atomic lines arising from an atmospheric pressure microwave (2.45 GHz) surface wave discharge.

A particular attention has been paid to the study of the influence of Stark broadening contribution to the Lorentzian width of the spectral lines considered in this study, from which the van der Waals width is obtained. Comparison with other available methods (namely OH and N_2^+ ro-vibrational bands) is also provided.

The GRB Events and Spectra of the Afterglow

S. Simić

Department of Physics, Faculty of Science, University of Kragujevac

Radoja Domanovica 12, 34000 Kragujevac, Serbia

e-mail: ssimic@kg.ac.rs

Abstract

First, we will discuss an external shock wave model and its capabilities to explain Gamma Ray Bursts (GRBs) afterglow. Further on we demonstrate that the model can well fit the afterglow light curves and discuss how to connect this model with the spectral characteristics of the GRB afterglow. For such dynamical phenomena it is difficult to achieve a good spectral observation, so we pay attention on quality and current observations of the spectra in the GRB afterglow. Also, we have presented few recent observations of high resolution instruments in order to demonstrate current state in this field of science.