Examples of Line Profiles from Laboratory Plasma Similar to Profiles from Astrophysical Plasmas

J. Purić[1,2], N. Cvetanović[1,2], B. M. Obradović[1,2], I. P. Dojčinović[1,2] & M. M. Kuraica[1,2]

[1]*Faculty of Physics, University of Belgrade, P.O. Box 368, 11001 Belgrade, Serbia*
[2]*Center for Science and Development of Technology, Obilićev Venac 26, 11000 Belgrade, Serbia*
e-mail: epuric@ff.bg.ac.yu, nikola@ff.bg.ac.rs, obrat@ff.bg.ac.rs, ivbi@ff.bg.ac.rs, kuki@ff.bg.ac.rs

Abstract

In this paper several examples of line spectra form five different laboratory plasma sources are presented. Polarization Stark spectroscopy using hydrogen and helium lines is used for measuring electric filed strength in the discharges. Doppler shifted and excessively broadened profiles are obtained showing presence of atoms with velocities close to those in the narrow line region of AGN. Radiation from a high energy, high density plasma source features very broad profiles used for determination of plasma density. Systematic interpretation of spectra is needed in the conditions where several effects are present simultaneously: electric and magnetic field, Doppler effect and plasma inhomogeneity. Examples of line of sight influence on line profile are also presented. Similarity between laboratory and astrophysical profiles open a possible field for experimental simulation of astrophysical plasmas. To that aim an experiment was devoted to the investigation of hydrogen lines absorption by inhomogeneous plasma.

The nature of gas and stars in the circumnuclear regions of AGN: a chemical approach

P. Rafanelli

Department of Astronomy, University of Padova,
Vicolo Osservatorio 3, 35122 Padova, Italy
e-mail: piero.rafanelli@unipd.it

Abstract

The analysis of the chemical composition of gas in the circumnuclear regions of a sample of Seyfert-2 (S2) galaxies and of a sample of star forming (SF) galaxies shows that the abundance of heavy elements is definitely higher in S2 than in SF galaxies. This result is in agreement with the recent finding that the typical stellar population of the circumnuclear regions of S2 is characterized by the lack of hot early type stars, if compared with SF galaxies, and by evident signs of a recent star formation history, if compared with normal spirals.

The chemical composition of the nuclear stellar component of a sample of normal spiral galaxies, derived analyzing the Mg I absorption feature in their spectra, is used for discussing the obtained results in the frame of an evolutionary context.

The spectroscopic data used in this work have been extracted from the Sloan Digital Sky Survey (SDSS)