Course title: Optical plasma diagnostic

Status: elective

ECTS: 15

Requiremets: Master in plasma physics

Learning objectives

Obtaining knowledge about the methods for plasma diagnostics applying optical spectroscopy.

Learning outcomes

Abilities:

- General: Ability for professional and scientific activities in the field of plasma diagnostics by applying optical spectroscopy methods at scientific and industrial level.

- Specific: Ability for setting up and performing experiments. Application of different methods based on optical spectroscopy for the plasma diagnostic purposes – plasma electron density and temperature determination. Ability to discuss the results obtained. Inclusion in scientific and industrial processes based on plasma technologies.

Syllabus

Theory

Plasma temperature. Plasma tepretaure determination from absolute line intensities. Plasma electron Temperature determination from relative line intensities. Plasma electron temperature determination from lin-to- continuum intensity ratio. Electron temperature deremnination from the slope of continuum. Determination of the tepretaure of heavy particles from Doppler line profiles. Fowler-Milne method for plasma temperature determination. Plsama electron determination from the shift of spectral lines.

Plasma electron density. Plasma electron density determination the absolute line intensities. Plasma electron density determination from Stark broadening of the spectral lines. Plasma electron density determination from Stark widths of hydrogen spectral lines. Ingis-Teler method for plasma electron density determination.

Practical

Application of different methods to plasma electron density determination on pusled and contnuous plasma sorces.

Literature

1. H. R. Griem, Plasma spectroscopy, McGrow-Hill, New York (1974).
2. H. R. Griem, Principles of plasma Spectroscopy, Cambridge University Press (1977).
3. J. Cooper, Plasma spectroscopy, Plasma Physic Group, Imperial College, London
4. M. Venugoplan Ed., Reactions under plasma conditions, Ch. 7, F. Cabannes and J. Chapelle, Spectroscopic plasma diagnostic, Wiley-Interscience, New York
5. R. H. Huddlestone and S. L. Leonard Eds., Plasma diagnostic techniques, Academic Press, New York (1965).
6. W. Lochte-Holtgreven, Ed., Plasma diagnostic, North-Holland, Amsterdam (1968).
7. R. H. Kingston, Optical sources, detectors and systems, fundamentals and applications, Academic Press (1995).
8. A. P. Thorne, Spectrophysics, Chapman and Hall & Science paperbacks, London (1974).

Weekly teaching load:	Lectures: 6	Practise: 4