Level: PhD

Course title: Optical plasma diagnostics

Status: elective

ECTS: 15

Requirements: 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

Theoretical instruction

Plasma temperature. Plasma temperature determination from absolute line intensities. Plasma electron Temperature determination from relative line intensities. Plasma electron temperature determination from line-to- continuum intensity ratio. Electron temperature determination from the slope of continuum. Determination of the temperature of heavy particles from Doppler line profiles. Fowler-Milne method for plasma temperature determination. Plasma 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. Inglis-Teller method for plasma electron density determination.

Practical instruction

Application of different methods to plasma electron density determination in pulsed and continuous plasma sources.

Weekly teaching load				Other:
Lectures: 6	Exercises:	Other forms of teaching:	Student research: 4	