



FIM3005 Luminescence Spectroscopy of Semiconductors 6.0 credits

Luminiscens spektroskopi av halvledare

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FIM3005 valid from Autumn 2013

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Prerequisites

- Solid State Physics
- Introductory Quantum Mechanics, Optics

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After finishing the course students will be able to:

- Operate in semiconductor photophysics terms
- Distinguish between processes in nanostructured and bulk materials
- Implement these concepts in the description of practical devices
- Select most adequate luminescence technique for characterization of a particular system
- Examine optical properties of various systems using luminescence method

Course contents

- Excitons and Phonons in Luminescence
- Radiative and Non-Radiative Recombination
- Stimulated Emission
- Low-Dimensional Semiconductors
- Experimental Techniques of Luminescence Spectroscopy

Disposition

The goal of the course is to attain a firm grasp on basic optical processes in bulk and nanostructured semiconductors and to be able to design and interpret various luminescence experiments probing these processes. Thus along with fundamental concepts, such as exciton, stimulated emission and phonon interaction, practical experimental methods will be also considered. The course is aimed at PhD students exploring optical properties of semiconductors and nanostructures. This is a new course based on the recent book with the same title published by Jan Valenta and Ivan Pelant in 2012.

Course literature

- Ivan Pelant and Jan Valenta "Luminescence Spectroscopy of Semiconductors", Oxford University Press, 2012, ISBN 978-0-19-958833-6

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

The course is seminar-oriented, where students take turns in presenting book chapters to the audience. Presentations are followed by discussion where participants need to be prepared with relevant questions at hand. The quality of presentations and activity at seminars will be evaluated and comprise half of the total score. A problem-solving homework is the other half of the examination. One laboratory work is planned, where students can test optical methods on their samples. To achieve passing mark a 60% threshold in total scoring should be attained.

Other requirements for final grade

60%

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.