FSK3420 Nonlinear Optics 10.5 credits

Ickelinjär optik

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

Establishment

Course syllabus for FSK3420 valid from Spring 2010

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

MSc degree in physics or equivalent education.

Specifically, it is assumed that the student has a working knowledge of vector analysis, EM-wave theory, quantum mechanics and basic solid-state physics.

Language of instruction: English only

Language of instruction

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

Intended learning outcomes

The aim of the course is that the student shall:

- be thoroughly acquainted with all the basic elements of the theory of nonlinear optics
- be able to formulate a well-structured and physically significant problem within the main areas of nonlinear optics and provide an extended solution, and
- present the problem and discuss the solutions in front of the whole class

Course contents

- Nonlinear interaction between a light field and matter.
- Perturbation calculations.
- Strong EM-fields.
- Quantum mechanical calculations.
- Crystallography.
- Block equation.
- Application of nonlinear optics.

Course literature

P N Butcher and D Cotter: "The Elements of Nonlinear Optics" (1998)

Extended lecture notes and chapters from other main sources.

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.

Other requirements for final grade

Solving a large number of homework problems.

Designing some (1 or 2) problems of his/her own. Provide an annotated, extended solutions to these problems and present them to the class.

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.