FSI3280 Neutron Scattering in Condensed Matter Physics 7.5 credits

Neutronspridning inom kondenserade materiens fysik

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

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

Establishment

Course syllabus for FSI3280 valid from Autumn 2015

Grading scale

Education cycle

Third cycle

Specific prerequisites

A solid base in physics, in particular statistical and quantum physics at the level of a Master's degree.

Language of instruction

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

Intended learning outcomes

Upon completion of the course the student should

- have a broad overview of concepts, methods and approaches within neutron scattering in condensed matter physics.
- realize how experimentally measured properties such as structure factors and linear response (susceptibility) is expressed theoretically.
- be familiar with the most important numerical methods used to calculate these quantities for theoretical models.
- have a good knowledge of how these quantities are measured experimentally and understand which factors must be considered in a quantitative comparison of theory and experiments.

Course contents

Basic Principles, Instrumentation, Structure Determination, Lattice Dynamics, Liquids and Amorphous Materials, Magnetic Structures, Magnetic excitations, Crystal-Field Transitions, Numerical methods such as Monte Carlo and spin-wave calculations and their relations to neutron scattering.

Disposition

The course will be structured around a weekly meeting with the teacher. These meetings consist of presentations, discussions and review of the work since the last meeting. The work for the next week is planned. Participation in a neutron scattering experiment is encouraged.

Course literature

Furrer, Mesot and Strässle: "Neutron Scattering in Condensed Matter Theory", 2009

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.

Other requirements for final grade

Solving 80% of given homework problems; participation in at least 85% of the weekly meetings.

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.