FSI3220 Theory of Superconductivity 7.5 credits

Teori för supraledning

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 FSI3220 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Language of instruction

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

Intended learning outcomes

Upon passing the course, the student should be able to:

- use microscopic methods to calculate and interpret magnetic response of superconductors
- use macroscopic methods to calculate fluctuation effects in superconductors
- use microscopic methods to calculate transport properties of the superconducting state

Course contents

The course covers the microscopic approach to superconducting states and the physics of fluctuations in superconductors. Covered areas are Ginzburg-Landau model beyond mean field. Fluctuations in superconductors. Josephson effect; BCS theory single and multiple bands; Bogoliubov-de-Gennes equation; Unconventional Cooper pairing; Superconducting quantum interference devices

Disposition

The course is offered either as a reading course or seminar series depending on the number of interested students.

Specific prerequisites

Prerequisites: Condensed Matter Physiscs SI2600, Statistical Mechanics SI2510 or equivalents

Course literature

V. Schmidt, The Physics of Superconductors Introduction to Fundamentals and Applications

PG de Gennes, Superconductivity Of Metals And Alloys

Examination

- INL1 - Assignment, 7.5 credits, grading scale: P, F

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

Passing the course hand-in assignments.

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.