FSK3906 Quantum Circuits 7.5 credits

Kvantkretsar

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

Establishment

The dean at the SCI school has 2020-09-28 decided to establish this syllabus to apply from Autumn 2020, registration number: S-2020-1503

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Masters in applied physics ar Masters in electrical engineering with sufficient background in quantum physics.

Language of instruction

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

Intended learning outcomes

After finished course the student should be able to:

- apply basic theories af quantum transport
- formulate and analyze lumped-element model for quantum circuits explain basic concepts af quantum-limited measurement

Course contents

Basic quantum transport theory: Landauer's formula and Landauer-Biittiker's formalism, coulomb-blocked and single-electron circuits. Basic superconducting electronics: The Josephson effect and classical non-linear dynamics af superconducting circuits. Quantum electrodynamics af superconducting circuits and superconducting quantum bits. Hybrid quantum systems such as quantum optomechanics and quantum acoustics.

Examination

- TEN1 - Oral exam, 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.

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

Completion af all homework problems and passing the oral exam.

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.