FSH3371 Special Relativity 7.5 credits

Speciell relativitetsteori

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

Establishment

Course syllabus for FSH3371 valid from Autumn 2023

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Vector analysis

Electromagnetic Theory

Mathematical Methods in Physics

Language of instruction

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

Intended learning outcomes

After completion of the course you should be able to:

- Use tensor notation in relativity.
- Use Lorentz transformations.
- Apply the concepts of length contraction and time dilation.
- Describe experimental tests of special relativity.
- Use and solve problems in relativistic optics.
- Use and solve problems in relativistic mechanics (including kinematic problems).
- Analyze Maxwell's equations and use their relativistic invariance.
- Explain the principle of relativity.
- Perform simple analyses using the Hamilton and Lagrange formalisms in special relativity.
- Independently deepen your knowledge in how the course contents may be used in current research and sumarize new knowledge in a report.

Course contents

Repetition of tensor notation. The meaning of relativity. Einstein's postulates. Geometry of Minkowski space and Lorentz transformation. Length contraction and time dilation. Twin paradox and proper time. Relativistic optics. Relativistic mechanics. Electrodynamics. Hamilton and Lagrange formalism in relativity.

Examination

- TEN1 - Written exam, 6.0 credits, grading scale: P, F
- PRO1 - Project, 1.5 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.

In the normal case, TEN1 is a written exam and corresponds to the exam in SI2371. PRO1 is normally a written report testing deepened knowledge and ability for independent studies within a specialized area as well as an oral discussion surrounding the report.

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.

Additional regulations

The course cannot be part of a degree together with SI2371.