SI2371 Special Relativity 6.0 credits

Speciell relativitetsteori

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

Establishment

Course syllabus for SI2371 valid from Autumn 2010

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

Recommended prerequisites:

Vectoranalysis

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:

- Illustrate physical processes in special relativity using a space-time diagram.
- Apply the concepts of length contraction and time dilation as well as use Lorentz transformations.
- Solve simple kinematical problems.
- Analyze Maxwell's equations and use their relativistic invariance.
- Report some experimental tests of special relativity.
- Use tensor notation in SR.
- Explain the physical interpretations and implications of SR.
- Have knowledge about cosmolgical models

Course contents

Special Relativity (SR):

- Coordinate symmetries
- Newtonian physics and Galilean symmetry
- Electrodynamics and Lorentz symmetry
- Physical implications of Lorentz transformations (length contraction, time dilation, Doppler effect, twin paradox etc.)
- Relativistic momentum and energy-momentum tensor
- Geometry of the Minkowski space
- Tensors in SR

Course literature

Rindler: Introduction to special relativity.

Examination

- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, 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.

Other requirements for final grade

Written examination

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.