



FSH3161 Experimental Techniques for Astroparticle Physics

7.5 credits

Experimentella tekniker för astropartikelfysik

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 FSH3161 valid from Spring 2010

Grading scale

Education cycle

Third cycle

Specific prerequisites

This course is primarily designed for students performing doctoral studies in experimental astroparticle physics or experimental particle physics. The course may also be of interest to doctoral students studying experimental nuclear physics. Other doctoral students should discuss their participation in the course with the course examiner. The course language is English.

Language of instruction

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

Intended learning outcomes

After completing this course, the student should have:

- Identified an aspect of experimental techniques pertaining to particle astrophysics which they wish to study in detail.
- Presented the results of their studies in the form of a research seminar.
- Been able to address any questions arising during the seminar in a dedicated ‘follow-up’ session after the seminar.
- Participated actively in the discussion session following each seminar.
- Obtained an overview of the course material by attending other seminars given during the course.
- Submitted a written report in English on the seminar topic.

Course contents

A contemporary selection of experimental techniques in particle astrophysics, including:

- Antiparticle detection in space
- Methods for cosmic-ray composition studies
- Detection of ultra-high energy cosmic rays
- X-ray/gamma-ray detection in space and on the ground
- Measurements of gamma-/X-ray polarization
- Studies of the cosmic microwave background
- Neutrino detection
- Direct searches for dark matter

Course literature

Example literature:

- Research papers published in refereed scientific journals.
- Published proceedings from international conferences.

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.

- Presentation of a research seminar (~45 min) (3 credits).
- Presentation and discussion of follow-up material (~15-20 min) during a subsequent class meeting(1.5 credits).
- Active participation in at least 75% of the seminars (1.5 credits). Active participation is defined as asking questions during / after the seminar and participating in the ensuing discussion.
- A written report (8-10 A4 pages, 11 pt, including figures) on the seminar topic.(1.5 credits).

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.