EF2230 Experimental Techniques in Space Plasma Physics 6.0 credits

Experimentella metoder i rymdplasmafysik

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 EF2230 valid from Autumn 2010

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Electrical Engineering,Engineering Physics,Physics

Specific prerequisites

Electromagnetic theory, e.g. EI1200 or equivalent.

Documented proficiency in English corresponding to English A.

Language of instruction

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

Intended learning outcomes

The aim of the course is to give the students a working knowledge of various experimental techniques and measurement methods used in the ground based and satellite studies in space plasma physics. The focus is on getting both an understanding of the underlying physics and the working knowledge of the typical ranges of parameters involved, methods' performance and technical limitations.

After completing the course, a participant should be able to

- explain the physical operation principles of experimental techniques most commonly used in space plasma physics
- interpret the typical graphical presentation of the results of various measurements, such as satellite particle and field data, ground based magnetic, optical and radar observations; know coordinate systems used in studies of the near earth space
- describe in general terms technical implementation of various measurement methods
- identify the major limitations of the methods, provide order of magnitude estimate of performance (such as sensitivity, uncertainty, integration time etc) and typical range of measured quantities
- locate information about, critically analyze and make an oral presentation on a subject of relevance to the course
- carry out simple tasks including acquisition and/or analysis of data using commercial software (such as LabView, IDL, Matlab, etc)

Course contents

The course consists of lectures, student presentations and 'hands on' projects.

The lectures cover both theoretical foundations and practical aspects of some instruments and experimental methods, including particle and field measurements on space probes, and ground based optical and radar measurements. The student presentations will require participants to work with original papers (typically several of them) in order to prepare a seminar for the colleagues. A number of relevant topics are suggested, with a reference list. 'Hands on' activities involve working with some hardware, software and data.

Course literature

AGU monographs 'Measurement techniques in Space Plasmas', lecture notes, original papers.

Examination

- TEN1 - Examination, 6.0 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

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.