



# EF2215 Plasma Physics II 7.5 credits

## Plasmafysik II

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 EF2215 valid from Autumn 2009

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering, Engineering Physics, Physics

## Specific prerequisites

## Language of instruction

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

# Intended learning outcomes

After completed course, the students should be able to

- reproduce basic equations (as detailed in the syllabus) and explain the physical principles behind them
- show command of short derivations and show understanding of principles behind longer derivations
- give physical interpretation of the results of derivations
- to appreciate the difference between multicomponent plasmas and plasmas with charged dust particles
- be familiar with plasma regime where the particle interaction energy exceeds the thermal energy

## Course contents

### **Kinetic theory**

Fokker-Planck equation. Coulomb collision operator. Wave particle interaction, collision-free absorption mechanisms. Kinetic transport theory. Kinetic aspects of dusty plasma.

### **Magnetohydrodynamics**

Variation analysis for stability, Virial. MHD spectrum in a cylinder, unstable and stable modes, discrete spectrum and continuum. Newcombs and Suydams stability analysis.

### **Nonlinear effects**

Shocks, Double layers. Three wave coupling. Reconnection. Dusty plasmas as an example of strongly coupled plasmas.

## Course literature

Will be announced at course start.

## Examination

- TEN1 - Examination, 7.5 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.

## 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.