



ED3310 Plasma Waves, Advanced Course 6.0 credits

Plasmavågor, avancerad kurs

Course syllabus for ED3310 valid from Autumn 11

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

Grading scale:

Education cycle: Third cycle

Intended learning outcomes

When completing the course, the student should be able to

- Describe the main modifications of the response due to hot plasmas
- Characterize the most common waves in a hot plasma
- Describe how to calculate the change in the distribution function due to wave-particle interaction, using quasi-linear theory
- Describe RF-heating and current drive
- Characterize the drift waves
- Describe three-wave interactions
- Describe how the ponderomotive force affects the plasma

Course main content

Hot dielectric tensor; waves in hot plasmas, instabilities in velocity space (stimulated emission). Quasilinear diffusion in velocity space due to collisions and wave absorption; radio frequency heating and current drive. Linear mode conversion, the Budden equation.

Drift waves. Non-linear effects; ponderomotive force and three-wave interactions.

Disposition

Seminars or discussion meetings.

Language of instruction

Language of instruction is specified in the course offering information in the course and programme directory.

Eligibility

ED2210, Electromagnetic Processes in Dispersive Media or a similar course and FED3250 or FED3240

Literature

Lecture notes. References in lecture note required for understanding the notes.

T.H. Stix, Waves in Plasmas, American Institute of Physics, New York, 1992 Chapters 10, 11 13 14, 16, 17

e.g. in D.G. Swanson, Plasma Waves, second edition, Institute of Physics Publishing Ltd 2003 London

Examination

Requirements for final grade

Written and Final Oral examination