SI2510 Statistical Mechanics 7.5 credits

Statistisk mekanik

Course syllabus for SI2510 valid from Autumn 07

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

Grading scale: A, B, C, D, E, FX, F
Education cycle: Second cycle
Main field of study: Physics

Intended learning outcomes

The aim is to give additional knowledge in thermodynamics and statistical physics to what is given in the compulsory courses for F3. The main contents of the course is theory for phase transitions. After finished course the student should be able to:

- Describe, use and develop mean field theory for first and second order phase transitions.
- Realize the limitations of mean field theory.
- Realize the importance and strength of scaling arguments and be able to use such arguments.
- Be able to perform real space renormalization for simple models.
- Have knowledge about and be able to use the fundamental concepts in the theory of classical fluids.
- Ha knowledge about the structure of the solutions to a small number of analytically solvable models.

Course main content

Formal background of statistical mechanics. Classical simple fluids. Integral equation for correlation functions. Phase transitions. Mean field theory. The Ising model. Analytical solutions. Renormalization theory. Percolation and disorder.

Language of instruction

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

Eligibility

Recommended prerequisites: Statistical physics corresponding to SI1161 (5A1340).

Literature

M. Plischke & B. Bergersen: Equilibrium Statistical Physics, 3rd edition, World Scientific, 2006.

Examination

- INL1 - Assignment, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Requirements for final grade

One written exam (TEN1; 6 university credits)
Home exercises to hand in (INL1; 1,5 university credits)