IF2692 Statistical Physics 7.5 credits

Statistisk fysik

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 IF2692 valid from Autumn 2008

Grading scale

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

Education cycle

Second cycle

Main field of study

Physics

Specific prerequisites

Language of instruction

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

Intended learning outcomes

State the principal assumptions behind the statistical mechanical description.

- Derive Bolzman's law from the above assumptions.

- Use knowledge from probability theory and quantum mechanics to calculate the relevant partition function for a given system model.

- Motivate the second law of thermodynamics starting from Bolzman's law.

- Calculate thermodynamic functions from the partition function for a given system.

- Chose the appropriate (calculable) ensemble for a given system.

- Chose and minimize the adequate thermodynamic function in order to find the equilibrium state of a system.

- Starting from a real life situation and using knowledge in quantum mechanics, mechanics, solid state physics etc. create a system model whose partition function can be calculated.

- Critically evaluate the relevance and applicability of a system model.

Course contents

- **The microscopic foundations of thermodynamics**
- **Ensembles**
- **Identical particles and distributions**
- **Quantum liquids**
- **Phase transitions**
- **Applications in economics (on request)**

Course literature

Introductory statistical mechanics, R. Bowley and M. SánchezUpplaga: 2a Förlag: Oxford science publications År: 1999ISBN: 0198505760

Examination

- ANN1 - Exercise, 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.

The examination of the course is done through home work problems.

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.