Course syllabus

Spridningsmetoder
Scattering Methods

EXTN85, 7,5 credits, A (Second Cycle)

Valid for: 2023/24
Faculty: Faculty of Engineering, LTH
Decided by: PLED B/K
Date of Decision: 2023-04-18

General Information

Elective for: BME4, F4, N4
Language of instruction: The course will be given in English

Aim

The course aims to give a basic knowledge and understanding of different scattering methods used for studying structure and dynamics of colloidal dispersions.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- have the ability to understand and explain the general principles of static scattering experiments, and what information that may be obtained from such experiments,
- have the ability to understand and explain the general principles of dynamic light scattering experiments, and what information that may be obtained from such experiments,
- have the knowledge of and the ability to describe the general experimental setups for light scattering and small angle scattering of X-rays and neutrons.

Competences and skills
For a passing grade the student must

- have the ability to interpret the results from static scattering experiments from colloidal dispersions in terms of the static structure factor and the form factor,
- have the ability to interpret the results from dynamic light scattering experiments from colloidal dispersions,

- have the ability to compute the static scattering from a dispersion of spherical colloidal particles.

Contents

Lectures: The course begins with basic scattering theory and a derivation, from basic principles, of the scattering from a dispersion of spherical colloidal particles. This is followed by a presentation of different experimental methods, such as small angle neutron scattering (SANS), small angle Xray scattering (SAXS), and static and dynamic light scattering. As the main model system we treat dispersions of spherical particles but non-spherical particles will also be discussed.
Laboratory exercises: In the lab course we begin by studying the diffraction and scattering from slits and thin threads, as illustrations of the concept of scattering. We then do experiments on colloidal dispersions using SAXS and static and dynamic light scattering.

Examination details

Grading scale: UV - (U,G,VG) - (Fail, Pass, Pass with Distinction)
Assessment: Written examination , compulsory laboratory work and the submitted assignments. The final grade for the course is determined by the result of the examination.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts
Code: 0120. **Name:** Exam.
Credits: 5. **Grading scale:** UV. **Assessment:** Written exam
Code: 0220. **Name:** Laboratory Exercises.
Credits: 2,5. **Grading scale:** UG. **Assessment:** For passing grade, every task is performed and presented according to the instructions, which may mean either as a written report or orally, in Swedish or English.

Admission

Assumed prior knowledge: Compulsory courses in mathematics.
The number of participants is limited to: No
The course overlaps following course/s: KEMM37

Reading list

- In accordance with an approved literature list, which will be available on the department website at least five weeks before the start of the course.

Contact and other information

Course coordinator: Anna Stradner, anna.stradner@fkem1.lu.se
Course homepage: https://www.kemi.lu.se/english/education/courses/advanced-level-courses/kemm67/
Further information: The course is to be studied together with KEMM67, which is given by the Faculty of Science. Does not follow the study period structure.