



# FSK3821 Experimental Molecular Physics 6.0 credits

Experimentell molekylfysik

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

## Establishment

Course syllabus for FSK3821 valid from Spring 2010

## Grading scale

G

## Education cycle

Third cycle

## Specific prerequisites

Quantum physics for F4 (SI2170) or Laser spectroscopy for F4 (SK2800), or corresponding knowledge.

## Language of instruction

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

## Intended learning outcomes

The course aims to give basic knowledge about advanced experimental physics, such as the use of modern IR spectrometers, high resolution spectrometers, laser measurement methods

as LIBS (Laser induced breakdown spectroscopy) and Laser Raman spectroscopy. After the course the student will be able to:

- perform experiments on rotation and vibration spectroscopy
- use LIBS technology to measure concentration of metals
- use laser induced fluorescence techniques to measure vibrational constants
- use Laser Raman techniques on larger molecules in the liquid phase
- synthesize of molecular spectra with known molecular constants
- use laser spectroscopy to measure vibrational and rotational temperatures
- perform calculations applying the Franck-Condon approximation

## Course contents

Grating spectrometers. Principles of molecular transitions. Laser spectroscopy. Laser induced fluorescence. Experiments on iodine. Time-resolved spectroscopy and measurements on molecular iodine and its life-time. Laser induced breakdown spectroscopy. Measurements on metal samples. Determinations of elemental concentrations. Laser Raman spectroscopy and measurements on liquid nitrogen. Use of Notch filters. Infrared spectroscopy. Measurements on carbon monoxide. Determination of rotational constants. Synthesis of molecular spectra from molecular constants.

## Course literature

Handouts. Lars-Erik Berg

## Examination

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.

If the course is discontinued, students may request to be examined during the following two academic years.

LAB1 - Laborations, 6.0 credits, grade scale: P, F

## Other requirements for final grade

Laboration reports (LAB1; 6 credits, grade P/F)

## 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.