CH-343

Spectroscopy

Drabbels Marcel

Cursus	Sem.	Type
Chemistry and chemical engineering	BA4	Obl.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Oral
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

Introduction into optical spectroscopy of molecules

Content

- Overview of Molecular Spectroscopy
- Molecular Symmetry and Molecular Spectroscopy
- Rotational Spectroscopy
- Vibrational Spectroscopy
- Electronic Spectroscopy

Learning Prerequisites

Recommended courses

Quantum Chemistry

Learning Outcomes

By the end of the course, the student must be able to:

- Discuss the Born Oppenheimer approximation and its consequences
- Derive line intensities of transitions
- Derive rotational energy levels of different types of molecules
- Analyze rotational spectra
- Derive vibrational energy levels of molecules
- Analyze rovibrational spectra
- Describe Raman spectroscopy
- Analyze Raman spectra
- Formulate the Franck Condon principle
- Analyze rovibronic spectra of diatomic molecules
- Work out / Determine selection rules using group theory

Teaching methods

Ex Cathedra with excersise sessions

Expected student activities

Work on the excercises at home

Assessment methods

Oral exam

Resources

Bibliography

Primary References:

- J. M. Hollas, *Molecular Spectroscopy*
- C. H. Townes and A. L. Schawlow, *Microwave Spectroscopy*
- D. A. McQuarrie, *Quantum Chemistry*

Secondary References:

- G. Herzberg, *Molecular Spectra and Molecular Structure. I. Spectra of Diatomic Molecules*
- G. Herzberg, *Molecular Spectra and Molecular Structure. II. Infrared and Raman Spectra of Polyatomic Molecules*
- G. Herzberg, *Molecular Spectra and Molecular Structure. III. Electronic Spectra and Electronic Structure of Polyatomic Molecules*

Ressources en bibliothèque

- Find the references at the Library

Moodle Link

- https://go.epfl.ch/CH-343