Kursplan

Kursens namn på svenska Laserspektroskopi		
Kursens namn på engelska Laser Spectroscopy		
Högskolepoäng 8,0	Kurskod SK2800	Nivå Avancerad nivå
Huvudområde FYASK, TEFYS		
Organisatorisk enhet (kod) FY1	Kursplanen gäller från (termin) H20	

Kursens mål

The student should after the course be able to:

- solve questions concerning the quantum physical description of atoms and molecules and their spectral properties.
- use spectroscopical measurement techniques instrumentation and software, and present the results and their limitations.

Grading criteria

Course goal 1 (related to written exam)

grade (Fx); almost reached the level for grade E

grade (E); solve basic problems in some of the topics of the course and judge the accuracy of the answer.

grade(D); fulfill the requirement for grade (E) and partly for grade (C).

grade (C); solve basic and advanced problems in some of the topics of the course and judge the accuracy of the answer.

grade (B); fulfill the requirement for grade (C) and partly for grade (A).

grade (A); solve basic and advanced problems in most of the topics of the course and judge the accuracy of the answer.

Course goal 2 (related to the seminar presentation)

(P) make a oral presentation of a contemporary spectroscopy method, or application, for the class.

Course goal 3 (related to the laborations)

(P) participate in all the laborations and obtain a pass on the laboration reports.

Student who has gotten the grade Fx should solve additional problems to get grade E. The solutions should be handed in to the course responsible within 4 weeks after received grade.

Huvudsakligt innehåll

The course starts with a short introduction to the laser and its physical properties. Light-matter interaction is then presented using a quantum mechanical description, starting from the basics of atoms and molecules. A number of modern spectroscopic techniques and their use in biological and chemical physics, medicine, and environmental science. Focus is on practical examples from society and advanced techniques used in the research laboratory. The course includes laborations where we apply the measurement techniques and the data analysis studied.

The main topics of the course are: Structure and dynamics of molecules. The construction and function of lasers. Interaction between light and matter. Laser types: narrow band and tunable, continuous wave and pulsed lasers, ultra-fast lasers and their physical properties. Laser applications in molecular physics and chemical physics: absorption and fluorescence spectroscopy, time-resolved chemisty, spectroscopy of short lived molecules (free radicals and ions), Raman spectroscopy, laser induced breakdown spectroscopy (LIBS), femtosecond chemistry and spectroscopy, the use of the laser in the environment, in medicine and for diagnostic purposes.

Kurslitteratur

Laser Chemistry: Spectroscopy, Dynamics & Applications

Helmut H. Telle, Angel González Ureña, Robert J. Donovan, University of Edinburgh, Scotland

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Distributed material

Undervisningsspråk: Svenska

Förkunskapskrav

Modern Physics, or Molecular Structure for K2 and BIO2, or Quantum Chemistry and Spectroscopy for K4.

Betygsskala: A-F

Examination

One written exam (TEN1; 6 university credits). To get the final mark the laboratory experiments have to be completed and approved (LAB1; 2 university credits).

Övrigt

Fastställd den

Underskrift av GA	Underskrift av skolchef
Namnförtydligande	Namnförtydligande