IF1621 Quantum Mechanics I 7.5 credits

Kvantmekanik I

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

Establishment

Course syllabus for IF1621 valid from Autumn 2008

Grading scale

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

Education cycle

First cycle

Main field of study

Physics, Technology

Specific prerequisites

Knowledge corresponding to courses in elementary calculus in one or several variables, linear algebra, classical mechanics, and thermodynamics and waves.

Language of instruction

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

Intended learning outcomes

The purpose of the course is to gain understanding of quantum mechanical concepts and phenomena as well as through practical excercises being able to solve simple quantum mechanical problems. After the course the student should be able to:- solve the time dependent Schrödinger-equation for discrete two-level systems and being able to apply this to simple problems involving electron spin and photon polarisation.- understand the quantum mechanical description of the measurement process and concepts such as complementarity and the uncertainty relation.- solve the Schrödinger equation for the continous case for simple potentials such as the quantum well and the harmonic oscillator.- use approximation methods such as perturbation theory and variational calculus.- understand and use the rules for additions of spin and angular momenta.- solve the Schrödinger equation for hydrogen like atoms.- understand the principles behind chemical bonding.

Course contents

In the first part of the course we highlight important concepts such as quantum state, observables, Schrödinger equation, uncertainty relation and several of the methods we will use to calculate physical properties of systems. This is illustrated by studying simple discrete quantum systems whose mathematical description only makes use of linear algebra. Throughout the course we continue to develop these methods to be able to study more complex systems. When doing this we introduce continous systems and study in detail some important cases such as; the quantum well, the harmonic

Course literature

Introduction to Quantum mechanics , D.J. GriffithsUpplaga: Förlag: Prentice Hall År: 2005ISBN: 0131118927 Quantum Mechanics Demystified, David McMahonUpplaga: Förlag: Mc Graw Hill År: 2005ISBN: 0-0-7-145546- **Övrig litteratur**Föreläsningsanteckningar, exempelsamling, laborationshandledning**Lecture notes, manual with solved problems, laboratory excercise instruction Undervisningsspråk:** Svenska

Examination

- TEN1 - Examination, 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.

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

The course has a written exam and a laboration. In order to have a passing grade both the exam as well as the laboration should be approved.

Other requirements for final grade

Written exam at the end of the course.

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.