Quantum physics

Introducing

Description

Program (detailed content) :

Brief review of the wave function and introduction to Dirac's formalism.
Fundamental measurement postulates in quantum mechanics.
Dynamics of quantum systems.
Harmonic oscillator theory.
Kinetic momentum theory.

Main difficulties usually encountered by students :
Difficulties are essentially mathematical (new formalism and notations, solving the eigenvalue equation of a matrix, etc.).

Objectives

At the end of this module, the student should have understood and be able to explain (main concepts):
Fundamental postulates of measurements in quantum mechanics.
The time evolution of a quantum system.
The notion of plane wave and localized wave packet.
Harmonic oscillator theory and its applications.
Angular momentum theory and its applications.

The student should be able to :
Solve Schrödinger's equation (energy and eigenstates) in matrix formalism.
Apply the fundamental postulates relating to the measurement of a physical quantity.
Calculate the time evolution of a quantum state.
Manipulate the ladder operators of the harmonic oscillator and angular momentum.

Necessary prerequisites

-Nanophysics: Optics, Photonics, Nanotechnologies
-Electrostatics
-Classical mechanics

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

Toulouse