

# Mécanique quantique

## Lecturers

Frank FERRARI (Coordinator) and Sébastien CLESSE

## Course mnemonic

PHYS-F302

## ECTS credits

10 credits

## Language(s) of instruction

French

## Course period

First and second terms

## Campus

Plaine

K. Konishi et G. Paffuti, "Quantum Mechanics: A New Introduction" (Oxford)

S. Weinberg, "Lecture on Quantum Mechanics" (Cambridge)

## Course notes

Université virtuelle

## Other information

### Place(s) of teaching

Plaine

### Contact(s)

Frank Ferrari (frank.ferrari@ulb.ac.be)

## Course content

1. Non-relativistic quantum mechanics (postulates, problems in one dimension, harmonic oscillator, symmetry principles (in particular the invariance under rotations), perturbation theory, applications)
2. Introduction to relativistic quantum mechanics (second quantization)
3. Programming applied to quantum mechanics

## Objectives (and/or specific learning outcomes)

Modern course on Quantum Mechanics, emphasizing both in-depth presentation of fundamental topics and discussion of many applications.

## Pre-requisites and co-requisites

### Pre-requisites courses

PHYS-F203 | Introduction à la mécanique quantique | 5 crédits

## Teaching method and learning activities

Q1: online lectures, supervised exercises.

### References, bibliography and recommended reading

C. Cohen Tannoudji, B. Diu and F. Laloë, "Quantum Mechanics" (Hermann)

## Evaluation method(s)

Other

### Evaluation method(s) (additional information)

The course is divided into two parts (Part 1: quantum mechanics, 8 ECTS, Frank Ferrari; part 2: introduction to relativistic quantum mechanics, 2 ECTS, Peter Tiniakov).

First session: for parts 1 and 2, the evaluation may include personal work and a written exam in January.

Second session: written and/or oral exams for parts 1 and 2.

### Determination of the mark (including the weighting of partial marks)

For the first part: personal work (50% of the grade); written exam (50% of the grade)

The final grade is a weighted average of the three grades. For the academic year 2020/2021, the following rule will be used:

i) if the mark for part 1 is better than the mark for part 2, the weights for parts 1 and 2 will be 80% and 20%, respectively.

ii) if the mark for part 2 is better than the mark for part 1, the weights for parts 1 and 2 will be 70% and 30%, respectively.

For students passing in second session, grades greater or equal to 10/20 obtained during the first session in the parts 1 and/or 2 can be transferred to the second session, if the student does not pass the second session exam of the relevant part.

### Main language(s) of evaluation

French

## Programmes

Programmes proposing this course at the faculty  
of Sciences

BA-PHYS | Bachelor in Physics | unit 3

