UCLouvain

lphys2132

2023

Quantum field theory 1

10.00 credits	52.5 h + 7.5 h	Q1

Teacher(s)	Degrande Céline ;Drewes Marco ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Having followed LPHYS1241, LPHYS1342 and LPHYS1231 is an asset.
Main themes	This teaching unit is an introduction to quantum field theory. After a historical introduction, the main focus lies on quantum electrodynamics.
Learning outcomes	**At the end of this learning unit, the student is able to :** **a. Contribution of the teaching unit to the learning outcomes of the program (PHYS2M and PHYS2M1)** 1.1, 1.2, 1.6, 2.1, 2.5, 3.1, 3.2, 3.4, 4.1, 8.1, 8.2. **b. Specific learning outcomes of the teaching unit** At the end of this teaching unit, the student will be able to : 1. put the development of modern particle physics into a historical perspective ; 2. quantize photon and electron fields ; 3. compute elementary processes in quantum electrodynamics.
Evaluation methods	Oral exam, partly based on the project report.
Teaching methods	Lecture, tutorials, integrative project.
Content	Historical introduction Relativity and quantum mechanics Representations of the Lorentz group Quantization of photon and electron fields Quantum electrodynamics
Bibliography	Notes sur la genèse de la théorie quantique des champs (1897-1947). // Written notes on the genesis of quantum field theory (1897-1947). Mandl and Shaw – Quantum Field Theory (Chapters 1 to 10). Peskin and Schroeder – An Introduction to Quantum Field Theory (Part I).
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [60] in Physics	PHYS2M1	10		🔍
Master [120] in Physics	PHYS2M	10		🔍