


Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

10 credits	52.5 h + 7.5 h	Q1
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Teacher(s)	Degrande Céline ;Drewes Marco ;Lucente Michele ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	This teaching unit is an introduction to quantum field theory. After a historical introduction, the main focus lies on quantum electrodynamics.
Aims	<p><b>a. Contribution of the teaching unit to the learning outcomes of the program (PHYS2M and PHYS2M1)</b>                      1.1, 1.2, 1.6, 2.1, 2.5, 3.1, 3.2, 3.4, 4.1, 8.1, 8.2.</p> <p><b>b. Specific learning outcomes of the teaching unit</b></p> <p><sup>1</sup> At the end of this teaching unit, the student will be able to :</p> <ol style="list-style-type: none"> <li>1. put the development of modern particle physics into a historical perspective ;</li> <li>2. quantize photon and electron fields ;</li> <li>3. compute elementary processes in quantum electrodynamics.</li> </ol> <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> Oral exam, partly based on the project report.
Teaching methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> 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

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [60] in Physics	<a href="#">PHYS2M1</a>	10		
Master [120] in Physics	<a href="#">PHYS2M</a>	10		