UCL Université catholique de Louvain

LPHY2122

2014-2015

Quantum field theory II

5.0 credits	30.0 h	2q

Teacher(s) :	Govaerts Jan ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Main themes :	Quantisation of the scalar, Maxwell and Dirac fields Green's functions, propagators and micro-causality Interactions, electron-photon coupling and QED S-matrix and perturbation theory Feynman rules Self-energies of the scalar particle, the electron and the photon One-loop renormalization and the g-2 factor of spin ½ charged particles
Aims :	Introduction to the basics of quantisation, perturbation theory and renormalisation of relativistic quantum field theories in four dimensional Minkowski spacetime, leading to the Feynman rules and the systematics of multiplicative renormalisation. With emphasis on the case of Quantum Electrodynamics (QED), and illustrative examples taken from that theory as well as the interacting scalar field theory. *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".*
Other infos :	Method Traditional lecture course in the classroom, with solid personal study on behalf of the student Prerequisites Special relativity, electromagnetism, quantum physics, quantum mechanics, canonical quantisation, Dirac's equation Evaluation Written examination on a problem set followed by an oral discussion Course material and references Mark Srednicki, Quantum Field Theory (Cambridge University Press, 2007) M. E. Peskin and D. V. Schroeder, An Introduction to Quantum Field Theory (Perseus Books, 1995) C. Itzykson and J.-B. Zuber, Quantum Field Theory (McGraw Hill, New York, 1980) P. Ramond, Field Theory: A Modern Primer (Benjamin Cummings, Reading, 1981) Cliff Burgess and Guy Moore, The Standard Model: A Primer (Cambridge University Press, 2007)
Cycle and year of study :	> Master [120] in Physics
Faculty or entity in charge:	PHYS