



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisica Teorica II

2021-1-F1701Q100

Aims

Introduction to the Standard Model of Fundamental Interactions.

Contents

Application of Quantum Field Theory to the study of electroweak interactions. Introduction to renormalization theory.

Detailed program

Radiative corrections to Quantum Electrodynamics.

Regularization and renormalization of QED.

Symmetries e non abelian Gauge Theories.
Spontaneous symmetry breaking and Higgs mechanism.

Gauge Theory for weak interactions.

Standard Model of elementary particles.

Prerequisites

Good knowledge of Classical and Quantum Mechanics at the level of a Bachelor in Physics. Theoretical Physics I.

Teaching form

Lessons (28 hours) and exercise classes (22 hours). The lectures will be in english.

During the Covid-19 emergency all the lectures will be recorded and will appear on the e-learning page on the scheduled day. The lectures will be on streaming (still with recording) when possible and required by the students.

Textbook and teaching resource

The course is mostly based on:

M.E. Peskin, D.V. Schroeder, An Introduction to Quantum Field Theory, Avalon publishing

Other useful textbooks:

F. Mandl, G. Shaw, Quantum Field Theory, II Edition, Wiley ed.

M.D. Schwartz, Quantum Field Theory and The Standard Model, Cambridge Univ. press

S. Weinberg, Quantum Theory of Fields I and II Cambridge Univ. press.

Ramond, Field Theory: a modern primer, Avalon publishing. (useful for Poincare' and gauge theories)

Good online lectures (google it!):

Niklas Beisert, Quantum Field Theory (ETH, Zurich)

David Tong, Quantum Field Theory (Cambridge)

Riccardo Rattazzi, Quantum Field Theory (EPFL Lausanne)

Sidney Coleman, [Notes on Quantum Field Theory, https://arxiv.org/abs/1110.5013](https://arxiv.org/abs/1110.5013)

Semester

first semester, eight hours per week.

Assessment method

Oral exam concerning the topics discussed during the course. The student will be also asked to solve a simple exercise related to the content of the course (for example, renormalization of a loop diagram or formal manipulations related to gauge theories).

During the Covid-19 emergency exams will be online. Dates and instructions to participate as spectators will be posted on the e-learning page.

Office hours

Students may come to my office any time. If needed (and in the Covid emergency), send an e-mail to fix an appointment.
