UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Theoretical Physics II

2425-1-F1701Q100

Aims

Introduction to the Standard Model of Fundamental Interactions

Contents

The standard model of fundamental interactions

Detailed program

Covariant quantization of the Electromagnetic Field
Radiative corrections of QED
Charge, mass and WF renormalization, Ward identity
Infrared divergence
Regularization
Dimensional regularization
Anomalous magnetic moment of the electron
The Lamb shift
Positron decay. Application: the PET
The weak interaction
Four point Fermi interaction
Parity violation and the Wu experiment
Muon and Neutron decay
Higher orders, non renormalizability, IVB hypothesis
Symmetries and Gauge theories

Global and local symmetries
Yang-Mills interaction
U(1) gauge symmetry
SU(2)xU(1) gauge symmetry
A gauge theory for the weak interaction
Glashow model
Gauge leptons and bosons
Spontaneous symmetry breaking
Goldstone theorem
Brout-Englert-Higgs phenomenon
The electroweak lagrangian

Prerequisites

Fisica Teorica I

Teaching form

Lectures

Textbook and teaching resource

F. Mandl, G. Shaw, Quantum Field Theory, II Ed.
L. Maiani, Electroweak Interacions
M.D. Schwartz, Quantum Field Theory and The Standard Model
S. Raby, Introduction to the Standard Model and Beyond
Chen G.B., Derbes D., Griffiths D., Hill B., Sohn R., Ting Y.S (Eds.) - Lectures of Sidney Coleman on quantum field theory; World Scientific

Semester

I semester

Assessment method

Oral exam on the topics of the course

Office hours

On request

Sustainable Development Goals

QUALITY EDUCATION