



LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

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Winter Term 2019/20

# Quantum Field Theory I

S. Moch

## Course Description:

Quantum field theories emerged from the confluence of quantum mechanics and special relativity, and provide an amazingly accurate theoretical framework for describing the behaviour of subatomic particles and forces. This course will give an introduction into quantum field theory, both conceptually and technically. Canonical and covariant quantization methods will be discussed, with an emphasis on the path integral formulation, which finds numerous applications in both particle physics and condensed matter systems. Topics covered include quantization of bosonic and fermionic fields, functional techniques involving generating functionals and correlators, perturbation theory in terms of Feynman diagrams, and renormalisation group.

## Prerequisites:

Classical and quantum mechanics, electrodynamics, special relativity

## Literature:

- M. E. Peskin, D. V. Schroeder, *An introduction to quantum field theory*, ABP (1995)
- M. D. Schwartz, *Quantum Field theory and the Standard Model*, Cambridge University Press (2014)
- W. Siegel, *Fields*, <https://arxiv.org/abs/hep-th/9912205> (v3)

**Date and Place:** Mon, 8:30–10:00, Hörsaal III, Jungiusstr. 9  
Wed, 8:30–10:00, Hörsaal III, Jungiusstr. 9

**Problem Classes:** Mon, 10:15–11:45, Hörsaal III, Jungiusstr. 9  
Starting on: 21 October 2019

**Starting on:** 14 October 2019

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