UH
Universität Hamburg
DER FORSCHUNG I DER LEHRE I DER BILDUNG

CHAMPP
CENTER IN HAMBURG FOR
ASTRO-, MATHEMATICAL AND
PARTICLE PHYSICS

LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

Summer Term 2021

Quantum Field Theory II

Gleb Arutyunov

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 is based on the course Quantum Field Theory I and contains renormalization techniques and the S-matrix of QED. It discusses the electron self-energy, the vacuum polarization and the anomalous magnetic moment of electron. Non-abelian gauge theories will be covered, the covariant Faddeev–Popov-Method and the BRST-Symmetry will be introduced. Spontaneous symmetry breaking, the Goldstone-theorem as well as the Higgs mechanism also belong to the syllabus. Topological topics of QFT (solitons, monopols, instantons) will be treated as well.

Prerequisites:

Special relativity, Electrodynamics, Quantum Mechanics, Quantum Field Theory I

Literature:

Lecture notes by G. Arutyunov

Date and Place:	Wed 11:15–12:45, Zoom
	Thu 9:00–10:30, Zoom
Problem Classes:	Fri, 11:15–12:45, Moodle
Starting on:	7 April 2021