



LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

Winter Term 2020/2021

Quantum Mechanics II

Jürgen Reuter

Course Description:

Contents of the course are

- Quantum mechanics of many-particle systems
- Identical particles and statistics
- Bosons and fermions
- Hamiltonian of solid-state electrons,
- Mean field approximation and Hartree–Fock equations
- Occupation number representation, field quantization, field operators
- Partition sum, density operators,
- Relativistic Quantum Mechanics
- Representations of Lorentz group
- Klein-Gordon field, Dirac field and their quantization
- Properties of relativistic Dirac particles (electrons)

Prerequisites:

Builds upon all courses of theoretical physics, mechanics, electrodynamics and especially quantum mechanics

Literature:

The lecture will have a complete manuscript (hand-written). Here is some more helpful literature:

- Cohen-Tannoudji, Diu, Laloe: *Quantum Mechanics, Vol. 2*
- J.J. Sakurai: *Advanced Quantum Mechanics*
- M. Peskin, D. Schroeder: *Introduction to Quantum Field Theory*
- S. Weinberg: *Quantum Mechanics*

Date and Place:

Mon 16:00–17:30, Zoom
<https://uni-hamburg.zoom.us/j/94897475775>, Passcode: 87wg5v^d
Tue 12:00–13:30, Zoom
<https://uni-hamburg.zoom.us/j/93300277938>, Passcode: 18rXSRt6

Problem Classes:

Wed 10:15–11:45 or 16:00–17:30, Zoom

Starting on:

2 November 2020
