QFT & MBT 2020

Prerequisites

Special relativity (Lorentz transformations, covariant and contravariant indices as well as four-scalars, four-vectors, four-tensors)

Master-level quantum mechanics (second quantization, Dirac equation)

Statistical mechanics (partition functions and their relations to thermodynamic potentials; canonical and grand-canonical ensembles)

Generalities

- Password for all online material: path integral (with space!)
- All password-protected material is meant for YOU ONLY. No sharing of password or material in any way.
- Class webpage: http://www.physik.fu-berlin.de/en/einrichtungen/ag/ag-von-oppen/teaching/2022-SoSe-QFT/index.html

Lectures

Mo and Th 10-12 (Hörsaal B)
Will occasionally be switched with the tutorial session on Fr

Tutorial and problem sets

- Fr 10-12 (1.4.31)
- Problem sets are published on the webpage by Thursday and must be turned in **before** the beginning of class the following Thursday.
- The problem sets must be turned in individually and **in your own words**. Solving the problems in groups is, however, definitely encouraged!
- If you turned in a solution to a problem, be prepared to be “randomly” selected to present your solution during the tutorial. Credit for the problem is given only if you turn in a solution, you are available to present your solution when asked, and the presentation meets reasonable standards.
- You need 50 percent of the points for active participation.

Exam

- There will be an in-class exam on Friday, July 22 at 10-12am
- 2nd exam: Friday, October 14, 10-12am

Literature

E. Fradkin, Quantum Field Theory – an Integrated Approach, Princeton University Press

A. Zee, Quantum Field Theory in a Nutshell (Princeton)

L.S. Brown, Quantum Field Theory (Cambridge)

A. Altland and B. Simons, Condensed Matter Field Theory (Cambridge)

X.-G. Wen, Quantum Field Theory of Many-Body Physics (Oxford)

E. Fradkin, Field Theories of Condensed Matter Systems (Cambridge)

N Nagaosa, Quantum Field Theory in Condensed Matter Physics (Springer)

J. Negele and H. Orland, Quantum Many Particle Systems (Addison-Wesley)

H. Bruus and K. Flensberg, Many Body Quantum Theory in Condensed Matter Physics (Oxford)

A. Fetter and D. Walecka, Quantum Theory of Many-Particle Systems (McGraw-Hill)

A. Abrikosov, L. Gorkov, L. Dzyaloshinskii, Methods of Quatum Field Theoy in Statistical Physics (Dover)

P. Chaikin and T. Lubensky, Principles of Condensed Matter Physics (Cambridge)