

Quantum Field Theory

Lecturers: Felix v. Oppen

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Time	Lecture		
& Place:	Mo, Tu	10-12	HS A

Problem session

Fr 8-10 1.4.03

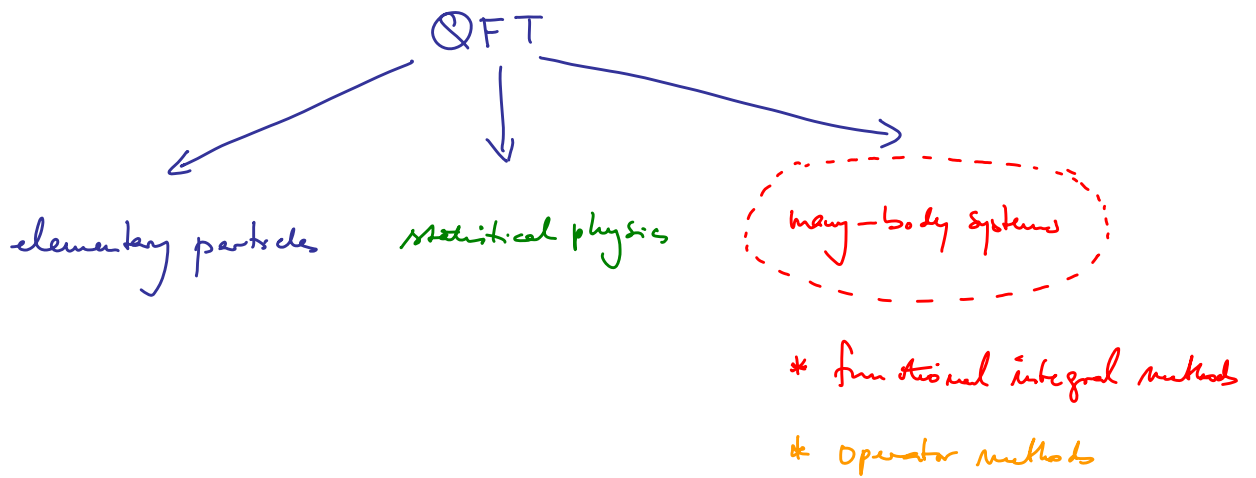
The problem session on Friday will at times be replaced by a lecture. The problem session will then take place during one of the time slots for lectures.

Exam: Fr 10.7.2015 8-10 HS A

Make-up exam: last week of summer break
OR first week of winter term 2015/16

Homework problems:

- * made available on website on Monday
- * solutions should be turned in on the following Monday before the class
- * must have 50% of points
- * solutions can be turned in in pairs if the problems were solved together



Literature

- 1) A. Altland, B. Simons, Condensed Matter Field Theory (Cambridge)
- 2) P. Chaikin, T. Lubensky, Principles of Condensed Matter Physics (Cambridge)
- 3) L.S. Brown, Quantum Field Theory (Cambridge)
- 4) A. Zee, Quantum Field Theory in a Nutshell (Princeton)
- 5) N. Nagaosa, Quantum Field Theory in Condensed Matter Physics (Springer)
- 6) H. Bruus, K. Flensberg, Many-Body Quantum Theory in Condensed Matter Physics (Oxford)
- 7) J. Negele, H. Orland, Quantum Many Particle Systems (Addison-Wesley)
- 8) A. Fetter, D. Walecka, Quantum Theory of Many-Particle Systems (Mc Graw-Hill)

9) A. Abrikosov, L. Gorkov, L. Dzyaloshinski, Methods of
Quantum Field Theory in Statistical Physics (Dover)

10) X.-G. Wen, Quantum Field Theory of Many-Body Systems

11) E. Fredkin, Field Theories of Condensed Matter Systems

... and many more

Quantum field theory

- Chapter 1: Free bosonic fields: harmonic chain
- Chapter 2: Path integrals
- Chapter 3: Linear response and correlation functions
- Chapter 4: Second quantisation
- Chapter 5: Boson functional integrals
- Chapter 6: Interacting Bose systems
- Chapter 7: Bose superfluidity
- Chapter 8: Bosons at finite temperature and vortex excitations
- Chapter 9: Fermion functional integral
- Chapter 10: Hubbard-Stratonovich transformation and RPA
- Chapter 11: Superconductivity
- Chapter 12: Topological terms
- Chapter 13: Perturbation theory and Feynman diagrams
- Chapter 14: Feynman diagrams for Green's functions