

Module: Specialization II

Module No.: physics630

Course:  universität**bonn**
Advanced Theoretical Condensed Matter Physics

Course No.: physics638

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+2	7	ST

Requirements:**Preparation:**

physics617 (Theoretical Condensed Matter Physics)

Form of Testing and Examination:

Requirements for the examination (written): successful work with the exercises

Length of Course:

1 semester

Aims of the Course:

Survey of methods of theoretical condensed matter physics and their application to prominent examples in regard to current research

Contents of the Course:

Bosonic systems:

Bose-Einstein condensation

Photonics

Quantum dynamics of many-electrons systems:

Feynman diagram technique for many-particle systems at finite temperature

Quantum magnetism, Kondo effect, Renormalization group techniques

Disordered systems: Electrons in a random potential

Superconductivity

Recommended Literature:

A. A. Abrikosov, L.P. Gorkov; Methods of Quantum Field Theory in Statistical Physics (Dover, New York 1977)

W. Nolting; Grundkurs Theoretische Physik Band 7: Vielteilchentheorie (Springer, Heidelberg 2002)

A. C. Hewson, The Kondo Problem to Heavy Fermions (Cambridge University Press, 1997)

C. Itzykson, J.-M. Drouffe; Statistical Field Theory (Cambridge University Press 1991)

J. R. Schrieffer; Theory of Superconductivity (Benjamin/Cummings, Reading/Mass, 1983)