

Secondary Area of Specialization

Solid State Theory / Computational Physics

Module No.: MN-P-PN-ThSol

status quo 08.05.2012

	HPW	estimated effort (h)	credit points
Lecture and Problem Class	6	240	8
Total	6	240	8

Contents

The module is subdivided into core courses, specialized courses and the advanced seminar

1. Core Courses
 - Solid State Theory (3+1 hpw): basic concepts to describe solids and their excitations, various applications (e.g. superconductivity and magnetism)
 - Computational Many-Body Physics (3+1 hpw)
 - Quantum Field Theory I (4+2 hpw)
2. Specialized courses:
 - Superconductivity
 - Correlated Systems, Magnetism, Orbital Excitations
 - Collective and Topological Excitations
 - Transporttheory, Disorderd Systems
 - Low-dimensional Systems, Nano Physics
 - Quantum-Hall Effect
 - Quantum Field Theory II
 - Lectures on Experimental Solid State Physics
 - and others
3. Advanced Seminar in topical subject of Solid State Theory (2 hpw)

A description of the specialized courses and the seminar will be published on the web pages of the department prior to each semester.

Literature

Recommendations for the individual courses will be posted on the department web pages.

Organization

The Secondary AoS Solid State Theory / Computational Physics is composed of:

1. At least one of the core courses: Solid State Theory (3+1 hpw), Computational Many-Body Physics (3+1 hpw) and Quantum Field Theory I (4+2 hpw)
2. Specialized courses
3. Advanced seminar (2 hpw)

in total (including Problem classes): 6 hpw.

Advanced Statistical Physics or Advanced Quantum Mechanics (if not credited elsewhere) can be used to replace a special topics course with 2 hpw.

Examinations

The module is passed by passing an oral examination covering the topics of all attended courses. To

be admitted to the exam, students must actively participate in the problem sessions (including the solution of homework problems).

The grade given for the module is equal to the grade of the oral examination.

Aims

comprehension of the fundamental concepts used to describe theoretically solids and their excitations / ability to describe phenomena like superconductivity and magnetism

Prerequisites for Participation

None

Prerequisites

Basic knowledge in theoretical physics at the level of the bachelor courses in physics

Frequency

Solid state theory I usually in the WS, Solid state theory II or Quantum field theory I in the SS, seminar every SS, specialized courses alternating

Soft Skills

None

Use in Other Courses of Study

As elective subject in other M.Sc. programs

Coordinators

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