### Theoretical Solid State Physics 2

**Abbreviation:** 11-TFK2-161-m01

**Module coordinator:** Managing Director of the Institute of Theoretical Physics and Astrophysics

**Module offered by:** Faculty of Physics and Astronomy

**ECTS:** 8

**Method of grading:** Numerical grade

**Only after succ. compl. of module(s):** --

**Duration:** 1 semester

**Module level:** Graduate

**Other prerequisites:** --

### Contents

A continuation of the first semester (11-TFK) might be the following syllabus:

5. Advanced topics of the theory of superconductivity (Bogoliubov-de Gennes equations, effective field theory, Anderson-Higgs description of the Meissner effect)

6. Unconventional superconductors (e.g. copper-oxide high-Tc superconductors)

7. Green's function methods and Feynman diagrammatic technique

8. The Kondo Effect (Anderson's "poor mans scaling", renormalization group)

### Intended learning outcomes

During the two-semester lecture, the students acquire a basic understanding of many topics of Solid-State Physics, which are addressed in classical textbooks, and thereby advance their knowledge of the underlying concepts and the methods of description. The course builds upon the courses "Experimental Condensed Matter Physics" and "Quantum Mechanics".

### Courses

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<tr>
<th>Type</th>
<th>Number of weekly contact hours</th>
<th>Language</th>
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<td>V</td>
<td>4</td>
<td>German or English</td>
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**Module taught in:** German or English

**Method of assessment:**

- Written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes)
- Oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).

If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.

Assessment offered: In the semester in which the course is offered and in the subsequent semester

Language of assessment: German and/or English

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

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### Module appears in

- Master's degree (1 major) Mathematics (2016)
- Master's degree (1 major) Physics (2016)
- Master's degree (1 major) Mathematical Physics (2016)
- Master's degree (1 major) Computational Mathematics (2016)
- Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
- Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)
Master's degree (1 major) Physics (2020)