

Module title		Abbreviation
Solid State Physics 2		11-FK2B-202-m01
Module coordinator		Module offered by
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy
ECTS	Method of grading	Only after succ. compl. of module(s)
8	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
Contents		
1. Electrons in a periodic potential – the band structure a. Electrical and thermal transport b. Bloch theorem c. Electrons 2. Semi-classical models of dynamic processes a. Electrical transport in partially and completely filled bands b. Fermi surfaces; measurement techniques c. Electrical transport in external magnetic fields d. Boltzmann-equations of transport 3. The dielectric function and ferroelectrics a. Macroscopic electrodynamics and microscopic theory b. Polarizability of solids, of lattices, of valence electrons and quasi-free electrons; optical phonons, polaritons, plasmons, inter-band transitions, Wannier-Mott excitons c. Ferromagnetism 4. Semiconductors a. Characteristics b. Intrinsic semiconductors c. Doped semiconductors d. Physics and applications of p-n junctions e. Heterostructures 5. Magnetism a. Atomic dia- and paramagnetism b. Dia- and paramagnetism in metals c. Ferromagnetism 6. Superconductivity a. Phenomena b. Models of superconductivity c. Tunnel experiments und applications		
Intended learning outcomes		
Knowledge of effects, concepts and models in advanced solid state physics. Familiarity with the theoretical principles and with applications of experimental methods.		
Courses (type, number of weekly contact hours, language — if other than German)		
V (4) + R (2) Module taught in: German or English		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) or d) project report (approx. 8 to 10 pages) or e) 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.

Language of assessment: German and/or English

Assessment offered: in semester of module and following semester

#### Allocation of places

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#### Additional information

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#### Workload

240 h

#### Teaching cycle

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#### Referred to in LPO I (examination regulations for teaching-degree programmes)

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#### Module appears in

Bachelor' degree (1 major) Physics (2020)

Bachelor' degree (1 major) Nanostructure Technology (2020)

Bachelor' degree (1 major) Quantum Technology (2021)

exchange program Physics (2023)