

Module description

Module title					Abbreviation
Quantum Mechanics II 11-QM2-Int-201-m01					
Module coordinator				Module offered by	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics Faculty of Physics and Astronomy					
ECTS	Method of grading Only after succ. co		Only after succ. com	npl. of module(s)	
8 numerical grade					
Duration		Module level	Other prerequisites		
1 semester u		undergraduate			
Contents					
 "Quantum mechanics 2" constitutes the central theoretical course to be taken within the international Master's program in physics. While the specific emphasis can be adjusted individually, the core topics that are supposed to be covered should include: Second quantization: fermions and bosons Band structures of particles in a crystal Angular momentum, symmetry operators, Lie Algebras Scattering theory: potential scattering, partial wave expansion Relativistic quantum mechanics: Klein-Gordon equation, Dirac equation, Lorentz group, fine structure splitting of atomic spectra Quantum entanglement Canonical formalism 					
Intended learning outcomes					
In-depth knowledge of advanced quantum mechanics. Thorough understanding of the mathematical and theore- tical concepts of the listed topics. Ability to describe or model problems of modern theoretical quantum physics mathematically, to solve problems analytically or using approximation methods and to interpret the results phy- sically. The course is pivotal to subsequent theory courses in astrophysics, high energy physics and condensed matter/solid state physics. The course is mandatory for all Master's students.					
Courses (type, number of weekly contact hours, language — if other than German)					
V (4) + R (2) Module taught in: 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 per candidate) 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: English Assessment offered: In the semester in which the course is offered and in the subsequent semester 					
Allocation of places					
Additio	nal info	ormation			
Worklo	ad				
240 h					

Teaching cycle

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

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Module appears in

Master's degree (1 major) Physics International (2020) Master's degree (1 major) Quantum Engineering (2020) exchange program Physics (2023) Master's degree (1 major) Quantum Engineering (2024) Master's degree (1 major) Physics International (2024)

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