

Module title		Abbreviation
Many Body Quantum Theory		11-QVTP-161-m01
Module coordinator		Module offered by
Managing Director of the Institute of Theoretical Physics and Astrophysics		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	graduate	--
Contents		
<p>In this lecture, Quantum Physics of many-particle systems are introduced on the basis of the perturbative methods of the Green's functions. A possible outline might be:</p> <ol style="list-style-type: none"> 1. Single-particle Green's function 2. Review of second quantisation 3. Perturbation theory using many-particle Green's functions at temperature $T=0$ 4. Perturbation theory for finite temperatures 5. Landau theory of Fermi liquids 6. Superconductivity 7. One-dimensional systems and bosonisation 		
Intended learning outcomes		
<p>The students acquire knowledge of the methods of quantum field theory in a non-relativistic context. This knowledge enables them to study properties of Fermi liquids (and bosonic systems) beyond the one-particle picture, and to understand the effects of interactions, including superconductivity and the Kondo effect.</p>		
Courses (type, number of weekly contact hours, language — if other than German)		
<p>V (4) + R (2) Module taught in: German or English</p>		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
<p>written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or 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</p>		
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

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)