

Module description

Module title			Abbreviation
Gauge Theories			11-EIT-161-m01
Module coordinator		Module offered by	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics			
ECTS Method of grading Only after succ. con		pl. of module(s)	
6 numerical grade			
Duration Module level	Other prerequisites		
1 semester graduate			
Contents			
The main topic of the course will usually be lattice gauge theories. The concepts may be taught and illustrated by elaborating on the role of lattice gauge theories in spin systems.			
 Introduction to lattice gauge theories for spin systems Phase transitions The transfer matrix The two-dimensional (2D) Ising model Ising lattice gauge theory Abelian lattice gauge theories The planar Heisenberg (XY) model in 2D (Kosterlitz-Thouless transition) Non-Abelian lattice gauge theories 			
Intended learning outcomes			
The students acquire in-depth understanding of gauge fields in classical and Quantum Physics. They are able to apply this knowledge to spin systems, illustrating the interplay between microscopic models and field-theoretic descriptions.			
Courses (type, number of weekly contact hours, language — if other than German)			
V (3) + R (1) 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)			
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			
Allocation of places			
Additional information			
Workload			
180 h			
Teaching cycle			

SI 83

VOEL

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

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)

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