

Module title		Abbreviation
Topological Order		11-TOPO-132-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)
6	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	graduate	--
Contents		
<p>In modern Solid-State Physics, the concept of topologically ordered phases plays an increasingly important role. These phases possess no order in the conventional sense of a broken symmetry, but are characterised by topological quantum numbers. Examples of topological quantum numbers or phases include:</p> <ol style="list-style-type: none"> 1) The fractional charge and statistics of quasiparticle excitation in quantum Hall fluids. 2) The fractional quantisation of spins in spin liquids and the accompanying split-up of spin and charge in anti-ferromagnets. 3) The topological anomalies of fractionally quantised systems on the torus (or generally on surfaces with genus $g > 0$). 4) Majorana fermion states at the interfaces between topological superconductors and topologically trivial regions. The lecture explains the fundamental concepts with the help of basic examples. 		
Intended learning outcomes		
The students acquire in-depth knowledge of topological order in quantum condensates.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + R (no information on SWS (weekly contact hours) and course language available)		
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>a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)</p> <p>Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.</p> <p>Language of assessment: German, English</p>		
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		
<p>Master's degree (1 major) Physics (2010)</p> <p>Master's degree (1 major) Physics (2011)</p> <p>Master's degree (1 major) FOKUS Physics (2010)</p> <p>Master's degree (1 major) FOKUS Physics (2011)</p>		