

CURRICULUM

The first two semesters focus on teaching and deepening student's knowledge of advanced scientific concepts and methods in physics. In the chosen field of study, compulsory modules (dark red in the figures) and modules from a compulsory elective catalog (light red) must be completed. Afterwards, the students work in a research group on a problem of current research. The third semester concentrates on introducing students to challenging scientific research work in two in-depth modules: "Research Phase 1: In-depth Knowledge Acquisition" (12 CP) and "Research Phase 2: Method Training" (12 CP). In the fourth semester, the master's thesis (30 CP) is written on a current scientific topic.

Winter semester	CP	QOT	UOS	NSP	LM / MED	LLM	OAS
Advanced Quantum Theory	9	■	■	■	■	■	■
Introduction of Quantum Optics	9	■	■	■	■	■	■
Modern Nanostructures 1: Basics and Synthesis Methods	6	■	■	■	■	■	■
Surface Physics and Scanning Probe Microscopy	9	■	■	■	■	■	■
Physics of Dense Plasmas	9	■	■	■	■	■	■
Advanced Experimental Molecular Physics	6	■	■	■	■	■	■
Bioimaging	6	■	■	■	■	■	■
Hydrodynamics	6	■	■	■	■	■	■
Computational Quantum and Many-Particle Physics	9	■	■	■	■	■	■
From Molecules to Solids	6	■	■	■	■	■	■
Quantum Technology	6	■	■	■	■	■	■
BioSystems Modeling and Simulation	6	■	■	■	■	■	■
Introduction of Atmospheric Physics	6	■	■	■	■	■	■
Ionosphere weather at low latitudes	3	■	■	■	■	■	■
Climate of the Earth System	6	■	■	■	■	■	■
Ocean Modeling	6	■	■	■	■	■	■
X-ray Nanooptics: Imaging and Scattering (every 2 nd yr)	3	■	■	■	■	■	■

Module catalogue in summer term: compulsory module – dark red, compulsory electives – light red

Physik

Master of Science

University of Rostock

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

DEPARTMENTAL STUDENT'S ADVISORY

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STUDENT SERVICE CENTER

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Information with status from: October 2022

Physik

Master of Science



FIELD OF STUDY

- Mathematics and Natural sciences

DEGREE

- Master of Science (M. Sc.)

TYPE OF PROGRAM

- Consecutive
- Single-subject Master's

DURATION

- 4 semesters, 120 Credit Points

LANGUAGE

- English

START DATE

- Annually with the winter semester (October 1st)
- Start possible also with the summer semester (April 1st)

FORMAL REQUIREMENTS

- Bachelor of Science in Physics or equivalent
- At least 25 Credit Points (CP) in Theoretical Physics, 25 CP in Mathematics, 40 CP in Experimental Physics
- Good knowledge of English (level B2 in CEFR)

STUDY FOR A DOCTORATE

- Receive the doctor's degree "Dr. rer. nat."
- Integrated Research Training Group at the Institute
- Department Life, Light & Matter of interdisciplinary faculty

OBJECTIVES OF STUDY

The Master's course expands on the substantive and methodological principles covered in the Bachelor's degree. It gives students the tools to understand and apply fundamental knowledge of physics. The content and forms of study are largely defined by the fusion of teaching and research. The aim of the course is to encourage students to undertake independent research. Students learn to address complex problems and solve them with scientific methods – including beyond the current limits of what we know. Graduates therefore acquire the skills as scientists that are required to complete a PhD.

ADMISSION REQUIREMENTS

Applicants should have a good bachelor's degree in physics. A strong interest in dealing with scientific and abstract issues is essential. Students also need a very good understanding of logic and maths and a good amount of stamina. A theoretical approach to issues, a practical disposition and a results-based approach to working and thinking will also be valuable. Good organisational skills are essential. Successful completion of the course will require good time management and self-discipline. Applicants have to proof sufficient English language skills.

CAREER PROSPECTS

The knowledge and skills acquired during the Master's degree in Physics open up a wide range of careers to graduates, including: Basic research at universities and institutes; applied research and development in industry; the development and application of measuring and testing technology; support for diagnostic and therapeutic medical procedures; management in innovative companies; careers as experts and consultants; planning and administrative roles in government.

TRACKS (STUDIENRICHTUNGEN)

- Quantum Optics and Technology (QOT)
- Ultrafast Optics and Spectroscopy (UOS)
- Nano and Surface Physics (NSP)
- Intense Laser-Matter Interaction and High Energy Density Physics (ILMI/HED)
- Physics of Life, Light, and Matter (LLM)
- Physics of Ocean, Atmosphere, and Space (OAS)

These tracks provide a broad spectrum of basic and specialized Masters' courses closely linked to the research fields of the professors at the Institute of Physics as well as other institutions such as the *Leibniz Institute for Baltic Sea Research*, *Leibniz Institute of Atmospheric Physics*, *Leibniz Institute for Plasma Science and Technology* and *DLR Institute for Solar-Terrestrial Physics*.

Summer semester	CP	QOT	UOS	NSP	ILMI/HED	LLM	OAS
Advanced Research Laboratory	6						
Laser Physics	6						
Quantum-Information, -Computing, and -Sensing	9						
Ultrafast Optics	6						
Nonlinear Optics and Spectroscopy	9						
Modern Nanostructures 2: Analysis and Specific Systems	6						
Intense Laser-Matter Interaction	9						
Molecular and Cellular Biophysics	6						
Topical Problems of Quantum Technology	3						
Astrophysics	6						
Space Weather	6						
International Space Weather Camp (Summer School)	3						
Radar and Radio Remote Sensing of the Atmosphere and Ionosphere	6						
Topical Problems of atmospheric and ionospheric physics	3						
Turbulence in Fluids	3						
Coastal Ocean Processes	3						
Climate of the Baltic Sea Region (summer school)	3						
Introduction to Quantum Field Theory (every 2 nd yr)	6						
General Relativity (every 2 nd yr)	3						
Atmospheric pressure plasmas (every 2 nd yr)	3						