PHYS-502 **Interacting quantum matter**

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Cursus	Sem.	Type
Ing.-phys	MA1, MA3	Opt.
Physicien	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	3 weekly
Exercises	1 weekly
Number of positions	

Summary

This course presents modern aspects of theoretical condensed matter physics with interfaces to statistical physics, quantum information theory, quantum field theory and quantum simulation.

Content

- Quantum Phase Transitions
- Topological Order
- Entanglement in Quantum Many Body Systems
- Non-Equilibrium Dynamics
- Lattice gauge theories in Condensed Matter and Synthetic Quantum Many Body Systems

Learning Prerequisites

Recommended courses

Solid State Physics III
Statistical physics III

Learning Outcomes

- Theorize modern approaches to interacting quantum matter

Transversal skills

- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate a capacity for creativity.
- Access and evaluate appropriate sources of information.
- Summarize an article or a technical report.

Teaching methods

Ex cathedra and exercises supervised in classroom

Assessment methods

Oral Exam (100%)

Supervision

Office hours	No
Assistants	Yes
Forum	No

Resources

Moodle Link

- https://go.epfl.ch/PHYS-502