

Cursus	Sem.	Type
Ing.-phys	MA1, MA3	Opt.
Minor in Quantum Science and Engineering	H	Opt.
Physicien	MA1, MA3	Opt.
Quantum Science and Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Lecture	3 weekly
Exercises	1 weekly
<b>Number of positions</b>	

### Remark

pas donné en 2023-24

### 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>