

PHYS-435

Statistical physics III

Cursus	Sem.	Type
Computational and Quantitative Biology		Opt.
Ing.-phys	MA1, MA3	Opt.
Physicien	MA1, MA3	Opt.

Language of teaching	English
Credits	6
Session	Winter
Semester	Fall
Exam	Written
Workload	180h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

Pas donné en 2024-25

Summary

This course introduces statistical field theory, and uses concepts related to phase transitions to discuss a variety of complex systems (random walks and polymers, disordered systems, combinatorial optimisation, information theory and error correcting codes).

Content

1. Introduction to statistical field theory
2. Random walks and self-avoiding polymers
3. Percolation, Networks
4. Information theory and error correcting codes
5. Disordered systems (spin glasses) and combinatorial complexity

Learning Prerequisites**Recommended courses**

Statistical Physics II

Learning Outcomes

By the end of the course, the student must be able to:

- Solve problems in complex systems

Transversal skills

- Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Ex cathedra. Exercises in class

Assessment methods

written exam

Resources

Moodle Link

- <https://go.epfl.ch/PHYS-435>