Statistical and Biological Physics

Module No.: MN-P-SP-StatBio, MN-P-PN-StatBio, MN-P-WaMa Version: 21.06.2017 BM

Course: Nonequilibrium Statistical Physics

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Category	Type	Language	Teaching Hours	CP	Semester
Core Course	Lecture	English	3+1	6	WiSe
Core Course	Lecture + Seminar	English	4+1	7.5	WiSe

Requirements for participation:
Statistical Mechanics

Type of module examinations:
Oral Examination or Term Paper

Duration of the course:
1 semester

Aims of the course:
Acquaintance with basic concepts of nonequilibrium physics; ability to apply the basic methods for the investigation of nonequilibrium problems; application of physics-based models to interdisciplinary problems.

Contents of the course:
- Principles of nonequilibrium physics
- Stochastic systems and their desription (master equation, Fokker-Planck equation,…)
- Analytical and numerical methods
- Nonequilibrium phase transitions
- Applications to traffic, pedestrian dynamics, economic systems, biology, pattern formation,…

Recommended literature:
A. Schadschneider, D. Chowdhury, K. Nishinari: Stochastic Transport in Complex Systems (Elsevier, 2010)
P.L. Krapivsky, S. Redner, E. Ben-Naim: A Kinetic View of Statistical Physics (Cambridge University Press, 2010)
V. Privman (Ed.): Nonequilibrium Statistical Mechanics in One Dimension (Cambridge University Press, 1997)
N.G.Van Kampen: Stochastic Processes in Physics and Chemistry (Elsevier, 1992)