DY 32 Nonlinear Stochastic Systems II

Zeit: Montag 14:00–15:00 Raum: TU H3010

Hauptvortrag DY 32.1 Mo 14:00 TU H3010

Disentangling trends and fluctuations in data sets of complex systems — •Rudolf Friedrich — Institut für Theoretische Physik, WWU Münster, Wilhelm-Klemm-Str. 9, 48149 Münster

The behaviour of complex systems can often be described by order parameters whose dynamics involve both deterministic and noisy components. The origin of the noise is the fast and irregular dynamics of the microscopic degrees of freedom composing the complex systems. In the present talk we discuss how to perform an analysis of experimental data by disentangling the effects of dynamical noise and deterministic evolution. We discuss how drift and diffusion coefficients of Langevin equations can be estimated from data. We report on results obtained for various complex systems like chaotic electric circuits, the motion of dissipative solitons in gas-discharge systems, turbulent flows, and biological data.

DY 32.2 Mo 14:30 TU H3010

Delayed feedback control of noise-induced patterns in 1D excitable media — •Valentina Beato[1], Alexander Balanov[1], Natalia Janson[2], Harald Engel[1], and Eckehard Schöll[1] — [1]Institut für Theortische Physik, Technische Universtität Berlin, Hardenberstr. 36, Berlin 10623, Germany — [2]Department of Mathematical Sciences, Loughborough University, Loughborough, Leicestershire, LE11 3TU, UK

We show that characteristic features of noise-induced spatio-temporal patterns can be effectively controlled using time delayed feedback. Actually, by variation of the time delay and the strength of the feedback one can deliberately change either the spatial or temporal coherence of noise-induced dynamics as well adjust its timescales.

DY 32.3 Mo 14:45 TU H3010

Noise-induced pattern formation in a semiconductor nanostructure — •Grischa Stegemann, Alexander G. Balanov, and Eckehard Schöll — Institut für Theoretische Physik, Technische Universität Berlin, D-10623 Berlin, Germany

We study the influence of noise upon the dynamics of the current density distribution in a model of a semiconductor nanostructure, namely, a double barrier resonant tunnelling diode. We fix the parameters of the system at values below the Hopf bifurcation where the only stable state of the system is a spatially inhomogeneous "filamentary"steady state. We show that the addition of weak Gaussian white noise to the system gives rise to spatially inhomogeneous oscillations. As the noise intensity grows, the oscillations tend to become more and more spatially homogeneous, while simultaneously the temporal coherence of the oscillations decreases.