Fritz-Haber-Institut der Max-Planck-Gesellschaft,
Humboldt-Universität zu Berlin, Max-Delbrück-Centrum
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Magdeburg, Physikalisch-Technische Bundesanstalt,
Technische Universität Berlin, Universität Potsdam

Berlin Center for Studies of Complex Chemical Systems

Seminar

Complex Nonlinear Processes in Chemistry and Biology

Honorary Chairman: G. Ertl
Organizers: M. Bär, C. Beta, H. Engel, M. Falcke, M. J. B. Hauser, J. Kurths, A. S. Mikhailov, P. Plath, L. Schimansky-Geier, and H. Stark

Friday, June 5, 2015, at 16:00
Address: Richard-Willstätter-Haus, Faradayweg 10, 14195 Berlin, U-Bahnhof Thielplatz (U3)

Dr. Igal Berenstein
Université Libre de Bruxelles, Belgium

Three different cases for spatiotemporal intermittency in reaction-diffusion systems

In this talk I show three different forms for spatiotemporal intermittency in reaction-diffusion systems. First, I show that in the Gray-Scott model, intermittency occurs after the Andronov homoclinic bifurcation, but before this bifurcation the system is already in a chaotic state of the form of defect-mediated turbulence[1]. The second system consists of a modified Oregonator model that in 0D shows a single limit cycle with bursting mixed mode oscillations, and in an extended system shows spatiotemporal intermittency. By analyzing the system in terms of slow and fast variables, it is possible to show how the system behaves as if it where a bistable system, and so explaining the spatiotemporal intermittency. The third model corresponds to a general model for pattern formation in the Belousov-Zhabotinsky reaction immersed in a reverse microemulsion[2], which shows spatiotemporal intermittency between waves and Turing patterns.

1. I. Berenstein and Y. De Decker. Chaos **24**, 043109 (2014).

2. S. Alonso, K. John and M. Bär. J. Chem. Phys. **134**, 094117 (2011).

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