

# Berlin Center for Studies of Complex Chemical Systems

Fritz-Haber-Institut der Max-Planck-Gesellschaft, Humboldt-Universität, Max-Delbrück-Centrum für Molekulare Medizin, Otto-von-Guericke-Universität Magdeburg, Physikalisch-Technische Bundesanstalt, Technische Universität Berlin, Universität Potsdam.

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, 15th June, 2012, 16:00 s.t.

**Address:** Richard-Willstätter-Haus, Faradayweg 10, 14195 Berlin, U-Bahnhof Thielplatz (U3).

Dr. Matthias Wolfrum

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### Collective and localized Turing patterns on irregular networks

We study the emergence of patterns in a diffusively coupled network that undergoes a Turing instability. Our main focus is the emergence of stable solutions with a single or a few differentiated nodes. Based on a mean-field approach, we study the bifurcations of such solutions for varying system parameters and varying degree of the differentiated node. Such solutions appear typically before the onset of Turing instability and provide the basis for the complex scenario of multistability and hysteresis that can be observed in such systems. Moreover, we discuss the appearance of stable collective patterns and present a codimension-two bifurcation that organizes the interplay between collective patterns and patterns with single differentiated nodes.