



Fritz-Haber-Institut der Max-Planck-Gesellschaft, Humboldt-Universität zu Berlin,  
Max-Delbrück-Centrum für Molekulare Medizin, Otto-von-Guericke-Universität  
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, January 23, 2015, at 16:00**

**Attention! Change of address:** Fritz-Haber-Villa, Faradayweg 8 (enter from the Hittorfstraße), 14195 Berlin, U-Bahnhof Thielplatz (U3)

**Dr. Christian Westendorf**

Institute of Plant Sciences, University of Graz, Austria

## Oscillatory dynamics in cellular and plasmodial slime molds

On a single cell level, oscillations are representations of the cells dynamic properties. Recently, we have investigated the oscillatory dynamics of the eukaryotic actin cytoskeleton in the cellular slime mold *Dictyostelium discoideum*. We systematically explored the response of the actin cytoskeleton to different external stimulations. The results revealed that the actin cytoskeleton and its guiding chemotactic machinery in *Dictyostelium discoideum* operate in the vicinity of an oscillatory instability. The research was subsequently extended to different cytoskeletal proteins, to investigate the intrinsic timescales of the system.

Contrary to cellular slime molds, syncytial or plasmodial slime molds grow as a large single cell, which relies on pulsatile contractions to distribute for instance food particles or chemical messengers. Its most prominent member *Physarum polycephalum* has emerged as a model organism to study network topology, biological fluid dynamics and foraging behavior. In this talk, I will present a first analysis of tube oscillations in related plasmodial slime molds of the *Myxogastria* and compare them to *Physarum polycephalum*. I will add notes on the applicability of these plasmodial slime molds as specimens, regarding biophysical questions and experiments.