



Berlin Center for Studies of Complex Chemical Systems e. V.

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, A.
S. Mikhailov, P. Plath, L. Schimansky-Geier, H. Stark, J. Kurths

Friday, 11th November 2011, 16:00 s.t.

Dr. Sebastian Heidenreich

PTB-Berlin, Mathematical Modeling and Data Analysis

Turbulence of bacterial suspensions

Abstract

From large scale atmospheric plasma instabilities to small scale bacterial turbulence, irregular flow motion appears in very different fluid systems. The investigation of system independent universal properties give a deep insight into the character of turbulence. In particular, the study of bacterial turbulence may lead to a better understanding of both the collective behavior of active soft matter and universal properties of turbulence. In the presentation, numerical solutions of a continuum model, experimental data of bacillus subtilis and molecular dynamics simulations of self-propelled hard rods are compared. Statistical quantities as structure functions, energy scalings and velocity distributions are calculated and compared for each system. In the result, there is a qualitatively good agreement between the theoretical description and experimental data. Furthermore, energy scaling and velocity distributions are similar to ordinary Navier-Stokes turbulence.

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