



PHYSIKALISCHES KOLLOQUIUM

Referent: **Prof. Dr. Joseph Brader**
University of Fribourg,
Switzerland



Thema: **Colloidal dispersions: Model systems for investigating collective behavior.**

Zeit und Ort: Dienstag, 28.01.2019, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Dr. Abhinav Sharma

Kurzfassung: Colloidal dispersions, consisting of small particles suspended in a liquid, are important for many commercial products and industrial processes. However, they also present a class of model systems, which are very useful for addressing fundamental questions in both equilibrium and non-equilibrium statistical mechanics. The key advantages of colloids compared to, e.g. atomic systems, are, (i) the particles are sufficiently large that they can be viewed (and tracked) directly using confocal microscopy methods, (ii) the interactions between the particles can be tuned to relatively high precision and, (iii) colloids can be readily manipulated by external fields (laser fields especially). In this talk I will attempt to offer a guide (from the perspective of a theorist) through a selection of many-body, collective phenomena exhibited by colloidal model systems. Throughout the presentation I will emphasize the strong interaction between theory, simulation and experiment, which has facilitated the rapid development of colloidal science. In addition to looking at bulk phase behavior we will consider how external fields can drive these systems out-of-equilibrium, leading to transient dynamics and non-equilibrium steady states. Following this theme, we will consider 'active' systems in which the self-propulsion of the particles can generate novel states which pose a challenge for theoretical understanding.

Biographie: JB studied Physics at the University of Bristol (UK) from 1994-1998 and remained in Bristol for Doctoral studies under the supervision of Prof. Robert Evans (PhD completed in 2001). After postdoctoral positions at the University of Chicago (2001-2001) and the University of Bern (2002-2005) JB moved to the Uni Konstanz (2005-2010), first as a postdoc and then progressing to group leader. In 2010 JB obtained a Swiss National Science Foundation Professorship to move to the University of Fribourg and, in 2012 became a permanent member of the Fribourg Physics Department.

