

## **Theoriekolloquium**

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Am **11. Januar 2017** um **14.15 Uhr** in **W2 1-143** hält

**Frau Prof. Dr. Sabine Klapp (Berlin)**

einen Vortrag mit dem Titel

### **Non-equilibrium dynamics and control of driven colloids at interfaces**

Colloidal systems have nowadays established their role as theoretically and experimentally accessible model systems not only for equilibrium, but also for non-equilibrium phenomena such as pattern formation, transport phenomena, synchronization, and active motion. In the present talk we focus on colloidal particles under the combined influence of an external driving force and restricted geometry. Exploring and controlling the emerging collective effects is a problem which is not only of fundamental interest, but has also strong relevance for applications in surface physics, the physics of friction, and in the area of (directed) particle transport.

The main part of the talk addresses spatially confined, interacting colloids under shear. We first discuss planar systems in presence of an externally applied shear rate. Based on particle-resolved simulations we find a sequence of states characterized by depinning, shear-induced melting, laning, and moving crystalline order with synchronized oscillations of the particles. The depinning can be very well described in terms of a simple model known from the theory of friction. All the transitions between these states have clear signatures in terms of mechanical as well as thermodynamic properties. We also discuss the appearance of moving local density heterogeneities, and propose (based on a reduced model) a method to enhance transport of such defects. The second example concerns colloids driven by a magnetic field within a circular trap. Here, our simulations reveal depinning phenomena and nonlinear rheology consistent with parallel experiments.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Andreas Engel