chemisch
physikalische
gesellschaft

Gegründet im Jahre 1869 von H. Hlasiwetz, J. Loschmidt, J. Petzval und J. Stefan

EINLADUNG

zum Vortrag
von

Prof. Dr. Peter Schurtenberger
Physical Chemistry, Lund University, Schweden

Assembling responsive nanoparticles

am

Dienstag, 3. Dezember 2013, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmanngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmanngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract:

It is clear that the design and fabrication of future materials and devices for photonics, molecular electronics, or drug delivery will enormously benefit if we are capable of self-assembling nanoparticles into synthetic nanostructures with the precision and reliability found in biological self-assembly. However, this requires control over their assembly into precise and predictable structures, which still remains the primary obstacle to the bottom-up construction of novel materials and devices. It can only be achieved if we understand the relationship between specific types of interactions and the resulting target structures, and subsequently develop the capability to engineer and control these interactions between the different building blocks. Progress in soft matter based materials science and nanotechnology thus critically depends on a sound understanding of the various intermolecular interactions acting in often highly complex systems.

It is here where responsive nanoparticles such as thermo- or pH-sensitive microgels or hybrid particles are ideal model systems to investigate the relationship between interactions and self-assembled structures. They allow for a variation of the form, strength and range of the interaction potential almost at will. I will in particular describe how we can use the thermo-response of a microgel shell to achieve an active control of the volume fraction and the interaction potential between core-shell particles in order to induce controlled particle self-assembly into crystalline or glassy structures, and reversibly cycle through different phase transitions in order to explore the rich variety of structures that exist in dense suspensions. I will show how we can create anisotropic interactions through the use of external electric fields, and how this can be extended to more complex particle shapes in an attempt to copy nature's well documented success in fabricating complex nanostructures such as virus shells via self-assembly.