Polymers under Multiple Constraints

Polymer- & Soft-Matter-Seminar

Tuesday,
24th April 2018

at: **5.15pm**

VDP4 1.27,
Von-Danckel-mann-Platz 4,
06120 Halle

Dr. Björn Kuttich

(Technische Universität Darmstadt, Institut für Festkörperphysik
Darmstadt, Germany)

“Macromolecules in spherical soft confinement"

Confinement effects on macromolecules, either synthetic polymers or proteins, are of great importance for nanotechnology and biology. The confinement may thereby affect both structural properties as well as the dynamics of the confined molecules. The situation is further complicated if a so-called soft confinement is considered. This type of confining geometry is deformable by the introduced guest molecules and exhibits shape variations on a time scale relevant for these.

In my talk I want to introduce two droplet phase microemulsions as soft confining geometry, based on two different surfactants, i.e. the ionic Aerosol-OT (AOT) and the non-ionic C12E4. In the absence of any guest molecule both systems show very similar structure and dynamics. However, their effect on low molecular weight polyethylene glycol (PEG) confined to the water filled core of the microemulsion differs strongly. This is caused by a different specific interaction between polymer and the respective surfactant molecules.

By applying small angle X-ray and neutron scattering as well as neutron spin echo spectroscopy and exploiting two complementary contrast situations by appropriate deuteration, structure and dynamics of the confined PEG can then be observed directly. The different dynamic contributions of the confining droplets and the confined polymer can be separated, revealing significant deviations from the polymer properties in bulk solution.