Polymers under Multiple Constraints

Polymer- & Soft-Matter-Seminar

SFB TRR 102

Tuesday,
12th February 2013

at: **5.15 pm**

VSP1 1.26

Von-Seckendorff- -Platz 1,
06120 Halle

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"Anomalous Dynamics in Polymer Melts"

It is well-known that the dynamics of a tagged monomer in polymeric systems is anomalous - i.e., its mean-square displacement (msd) is sub-diffusive - until the terminal relaxation time, beyond which the is msd becomes diffusive. In this talk will report simulations of polymer melts both in the un- and deep into the entangled regimes, for homopolymer melts as well as for a tagged chain in a matrix of surrounding chains (of different length). For unentangled melts, I will report deviations from the (almost universally) expected Rouse behaviour - for some reason this topic has remained relatively esoteric, but has been receiving some attention in recent times, both from experiments and from simulations. For entangled melts I will again report deviations from the expected Rouse behaviour: this is a first of kind study. The deviations are perfectly consistent with the scaling of the diffusion coefficient $D \sim N^{-3.45 \pm 0.1}$. I will argue that this scaling, different from the one expected from the tube theory $D \sim N^{-3}$, is unlikely to be caused by finite size effects, which the usually accepted explanation. Time permitting, I will also present a rheological perspective on preliminary stress relaxation data in our samples.

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