



Polymers under Multiple Constraints

Kolloquium

Thursday,

30th January
2014

at: 5.00 pm

Hörsaal für
Theoretische
Physik
Linnéstr. 5
04103 Leipzig

Coffee will be
served from 4.30
pm.

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Corrections to chain ideality in polymer melts

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An important concept in polymer physics is the Flory ideality hypothesis. This hypothesis states that polymer chains in a melt have random-walk-like conformations. However, theoretical [1–4] and numerical results [3,5] suggest that this view is an oversimplification. There are noticeable deviations from chain ideality, resulting from the interplay of chain connectivity and the incompressibility of the melt. This interplay leads to a swelling of chain segments and thus to a perturbation of the ideal chain conformation. We present an overview of the numerical evidence for these deviations and compare, where possible, the simulation data to theoretical predictions. Although the main body of the presented data will be on 3D polymer melts, the effect of spatial confinement (polymers in pores [4], polymer films [5]) will also be touched on.

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- [2] J.P. Wittmer, H. Meyer, J. Baschnagel, A. Johner, S. Obukhov, L. Mattioni, M. Müller, A. N. Semenov, *Phys. Rev. Lett.* **93** (2004) 147801.
- [3] J.P. Wittmer, A. Cavallo, H. Xu, J.E. Zabel, P. Políńska, N. Schulmann, H. Meyer, J. Farago, A. Johner, S.P. Obukhov, J. Baschnagel, *J. Stat. Phys.* **145** (2011) 1017.
- [4] N.-K. Lee, J. Farago, H. Meyer, J. P. Wittmer, J. Baschnagel, S. P. Obukhov, A. Johner, *Europhys. Lett.* **93** (2011) 48002.
- [5] H. Meyer, T. Kreer, A. Cavallo, J. P. Wittmer, J. Baschnagel, *Eur. Phys. J. Special Topics* **141** (2007) 167.