On the influence of excluded volume in polymer melts HENDRIK
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Institut Charles Sadron, CNRS UPR22, Strasbourg, France — Flory's ideality hypothesis states that polymer chains in the melt have random walk like conformations
as if there would be no excluded volume. However, it was shown recently that the
excluded volume interaction induces corrections to scaling which are long range and
which give rise to a power law decay of bond-bond correlation function [1] as well
as to corrections to the Kratky plateau of the form factor [2]. In this presentation, we focus on the Rouse mode analysis by switching on the excluded volume
potential gradually to study the crossover from phantom chains (representing perfect random walks described by the Rouse model) to real polymer melts [3]. In the
melt, significant corrections have to be made to the static Rouse mode spectrum
and consequences for the dynamics are briefly discussed. This gives also evidence
that subdiffusive behaviour found in contradiction to the Rouse model is also caused
by the excluded volume interaction. [1] J. Wittmer, H. Meyer, J. Baschnagel et. al.
Phys. Rev. Lett. 93 (2004) 147801. Phys. Rev. E 76 (2007) 011803. [2] J. Wittmer
et. al. EPL 77 (2007) 56003. [3] H. Meyer et. al. accepted at Eur. Phys. J. E
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