Coarse-graining strategy for polymers in solution

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I will discuss the basis of the coarse-graining strategy for polymers in solutions, which maps groups of monomers onto effective monomers, interacting through monomer-averaged state-dependent effective interactions. The level of coarse-graining, that is the number of effective monomer per chain, defines the length scale below which structural details are lost. I will present a recently developed model which allows to transfer effective interactions obtained at zero density, to any finite density by a suitable tuning of the level of coarse-graining, i.e. the number of effective monomers per chain [1]. This model, a refinement of previous unsatisfactory attempts [2,3,4], is able to provide accurate predictions for both the chain structure and the thermodynamics at any finite density, a feature, which is often missing in coarse-grained models. Extension to other thermodynamic conditions and to block copolymer chains will be discussed.

References:
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[4] G. D'Adamo, A. Pelissetto and C. Pierleoni: "Coarse-graining strategy in polymer solutions", Soft Matter (in print), http://arxiv.org/abs/1201.1193