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Soft Interactions and Structure Formation of Colloidal Microgels with a Cross-linker Gradient NIELS BOON, SOFI NJD, PETER HOLMQVIST, JRME CRASSOUS, PETER SCHURTENBERGER, Lund Univ/Lund Inst of Tech — Microgels are colloidal particles with a backbone composed of a cross-linked polymer. They offer high control (in situ) over shape, size, charge, and soft interactions by stimuli such as temperature and pH. This can be used to explore novel routes towards complex-structure formation, which may be aided by external forces such as shear or electric fields. We study soft interactions between PNIPAM microgels, which are among the most commonly used microgels. Due to a heterogeneous distribution of cross-linker, these particles do not exactly behave like bulk gels. Our ab initio calculations confirm the presence of an heterogeneously swollen core that co-exists with a relatively large soft corona with dangling polymer ends. Also, we find a density profile that is in close agreement with measured form factors. This suggests that at low to moderate densities the microgels interact by means of interpenetrating dangling ends, while the cross-linked core deforms only at high packing fractions. We propose a model for understanding how soft interactions define high-density packings of these particles.

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