Effect of bidispersity in grafted chain length on potential of mean force between polymer grafted nanoparticles in a homopolymer matrix ARTHI JAYARAMAN, NITISH NAIR, University of Colorado at Boulder — In polymer nanocomposites consisting of polymer grafted nanoparticles in a polymer matrix the molecular weight of the grafted polymers plays a key role in dictating the effective inter-particle interactions. Despite the importance of graft molecular weight on effective inter-particle interactions in monodisperse polymer grafted nanoparticles, and evidence of non-trivial polydispersity effects in systems containing polymers grafted on flat surfaces, not much work has been done to explore polydipsersity effects in polymer grafted nanoparticles. In this talk we will present self-consistent PRISM theory-Monte Carlo simulation studies showing how bidispersity in grafted chain lengths affects the grafted chain conformations and inter-particle interactions in a dense homopolymer polymer matrix. The value of the potential of mean force (PMF) between bidisperse grafted particles at contact is governed by the short grafts and values at large inter-particle distances are governed by the longer grafts. Our results suggest that by introducing bidispersity in grafted chains one can change the rules seen in monodisperse polymer grafted particles for wetting/dewetting of grafted polymers by matrix polymer.

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