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Interplay of cooperativity and entanglements in polymer melt dynamics: insights from theory and simulations[1] MARINA GUENZA, IVAN LYUBIMOV, University of Oregon — Dynamical heterogeneities in polymer melts generate cooperative ?motion, which results in subdiffusive center-of-mass mean-square ?displacement at times shorter than the longest Rouse relaxation time. ?This behavior is described by our Generalized Langevin Equation ?for cooperative dynamics, which is found to be in agreement with data ?from simulations and from Neuron Spin Echo experiments. We present a ?study of the interplay between cooperative dynamics and polymer ?confinement due to the presence of entanglements. Semi-flexibility, ?which is specific to the chemical structure of the polymer, and ?intermolecular interactions, which generate dynamical cooperativity ?and entanglements and are functions of the degree of polymerization, ?are explicitly included in the theory.

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