

Abstract Submitted  
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**Viscoelastic hydrodynamic interactions and anomalous CM diffusion in polymer melts**<sup>1</sup> HENDRIK MEYER, Institut Charles Sadron, CNRS Strasbourg, France — We have recently discovered that anomalous center-of-mass (CM) diffusion occurring on intermediate time scales in polymer melts can be explained by the interplay of viscoelastic and hydrodynamic interactions (VHI). The theory has been solved for unentangled melts in 3D [1] and 2D [2] and excellent agreement between theory and simulation is found, also for alkanes with a force field optimized from neutron scattering [3]. The physical mechanism considers that hydrodynamic interactions are not screened: they are time dependent because of increasing viscosity before the terminal relaxation time. The VHI are generally active in melts of any topology. They are most important at early times well before the terminal relaxation time and thus affect the nanosecond time range typically observable in dynamic neutron scattering experiments [1,3]. We illustrate the effects with recent molecular dynamics simulations of linear, ring and star polymers. [1] PRL 107, 178301 (2011); PRE 85, 051807 (2012). [2] PRL 109, 248304 (2012); Soft Matter 9, 4249 (2013). [3] PRL 111, 173003 (2013).

<sup>1</sup>Work performed with A.N. Semenov and J. Farago

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