Characteristic length scale of the inhomogeneous mode-coupling theory: beyond scaling predictions

ELIJAH FLENNER, GRZEGORZ SZAMEL, Colorado State University - Chemistry Department — The inhomogenous mode-coupling theory of Biroli et al. [Phys. Rev. Lett. 97, 195701 (2006)] allows for the identification of a characteristic length scale that diverges as the mode-coupling transition is approached. We numerically investigate this length scale as a function of time, wave-vector, and distance from the transition by examining the small $q$ expansion of the dynamic susceptibility $\xi_q(k; t)$ defined by Biroli et al. We confirm the scaling predictions of Biroli et al.. In addition, we show that the characteristic length is in qualitative agreement with simulations where the length scale is obtained from four-point correlation functions. Finally, we show that the length scale has virtually no $k$ dependence and thus it is well defined. The $k$-independence of the length contrasts with the very strong $k$ dependence of $q \to 0$ limit of the dynamic susceptibility.