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Universal exponential tails in the displacement distribution observed in an attractive colloidal glass YONGXIANG GAO, MARIA KILFOIL, McGill University — Dynamical heterogeneities exist ubiquitously in glassy materials. They manifest themselves as a non-Gaussian distribution of the constituent particle displacements, that is, the self part of the van Hove correlation function. Though the shape of the tail of the distribution looks exponential or nearly exponential, not until recently has serious attention been paid to it. We observe pure exponential behavior—neither stretched nor compressed—over a wide range of volume fractions and time scales in an attractive colloidal system on the route to attractive glass transition. We observe universal behavior as all the distributions over a wide range of τ and ϕ can be scaled together. The tails arise from the mobile sub-component of the constituent particles. If time permits, I will also show our studies on the structure of colloidal gels and attractive glasses in terms of a translational order parameter and an orientational order parameter, under different interaction strength, volume fraction and buoyancy matching conditions.

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