MAR07-2006-003675

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Dynamical heterogeneity at the jamming transition

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We investigate the dynamics of a variety of soft materials close to the jamming transition, including strongly attractive colloidal gels, concentrated surfactant phases, and charged platelets (Laponite). By using novel time- and space-resolved light scattering techniques, we show that, quite generally, the dynamics of these systems are strongly hetergogeneous both in time and space, suggesting that they relax through discrete rearrangement events. Surprisingly, we find that each event affects a volume much larger that the size of the system's constituent (particles or clusters). This finding is in stark contrast with simulations and experiments on supercooled fluids, where spatial correlations of the dynamics extend over a few particles at most.