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Aging in dense colloids through the growth and breakup of strongly correlated clusters[1] SKANDA VIVEK, STEFAN BOETTCHER, Physics Dept., Emory University, PAOLO SIBANI, University of Southern Denmark — Colloidal systems exhibit glassy behaviour under the right physical conditions that can be observed through mean square displacements in experiments. Our phenomenological model of aging in colloids is based on the growth and breakup of strongly correlated clusters, which introduces dynamical heterogeneity in the system.[2] Particles move and associate into clusters that can break up with a probability that decreases with cluster size. Different colloidal density regimes correspond to different probabilities. The mean square displacements measured in this system for a low density colloid shows a linear increase in time and shows a linear increase in log-time for high densities, which matches experimental data. The cluster breakup rate was measured to be uniform in time for low densities and $\propto 1/t$ in the aging regime, which provides a clock for the slowing down of the dynamics. Measurements of the four-point susceptibility χ_4 show a peak indicating the response to a growing lengthscale that satisfies a scaling relation with sample age, t_w. For larger t_w, χ_4 peaks higher, and decays more slowly with time, which we hypothesize is due to the dominance of relatively stable large clusters.

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[2]Boettcher & Sibani, J.Phys.CM **23**, 065103 (2011)

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