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Nonequilibrium state diagram of weakly attractive colloids JACINTA CONRAD, HANS WYSS, Harvard University, SULIANA MANLEY, MIT, KUNIMASA MIYAZAKI, LAURA KAUFMAN, DAVID REICHMAN, Columbia University, VERONIQUE TRAPPE, University of Fribourg, DAVE WEITZ, Harvard University — We study a colloidal suspension with weak long-range attractions at several volume fractions ranging from $\phi = 0.15$ to $\phi = 0.35$. The magnitude of the attraction is controlled by varying the concentration of a non-adsorbing polymer. At the lowest interaction energies, the dynamics measured by light scattering reflect single-particle Brownian motion, and the viscous modulus measured by rheology is dominant at experimental frequencies. At intermediate interaction energies, the dynamics are arrested, yet the viscous modulus still dominates. At high interaction energies, the dynamics are still arrested and the elastic modulus becomes dominant. Gelation in the regime of long-range attractions may result from spinodal decomposition into colloid-rich and colloid-poor regions; in this picture, solidification occurs when the volume fraction in the colloid-rich region crosses an attractive glass transition.

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