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Phase-Change Dynamics in Attractive, Polydisperse Colloidal Suspensions[1] JOHN MERGO, Cornell University, School of Applied and Engineering Physics, ITAI COHEN, Cornell University, Department of Physics, ANTHONY DINSMORE, University of Massachusetts Amherst, Department of Physics — Understanding the single-particle dynamics of phase changes in polydisperse suspensions is important for predicting the structures that arise in these systems. In this talk, we discuss the results of experiments on the melting and freezing of polydisperse colloidal particles. In these experiments, micron-sized colloidal particles are sedimented in water onto a glass coverslip to form a quasi two-dimensional gas. The particles experience an attractive interaction due to a size-tunable depletant added to the mixture. This allows both melting and freezing to be probed in the same experiment. Optical images with single-particle resolution are recorded and each particle is tracked through the duration of the experiment. Interestingly, we find that the increase in polydispersity may stabilize the fluid phase, which has previously been shown to be metastable in experiments on monodisperse particles. In particular, we explore the stability, structure, and dynamics of this fluid phase and how the structures in this phase solidify over time.

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