Crystallization in colloidal model systems

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We discuss the crystallization process from the supersaturated liquid state by means of the example of colloidal model systems. In the first part of the talk, we present an analysis of the influence of hydrodynamic interactions on the crystal nucleation process in suspensions of hard spheres. Then we show computer simulation results on crystallization close to the glass transition. And in the last part we show the non-equilibrium work distributions for a hard sphere system that is compressed and expanded through the crystal-liquid transition. The common topic between these studies is the question, how to coarse-grain the crystallization process, which is intrinsically a non-equilibrium phenomenon. We come to the conclusion that classical nucleation theory and related quasi-equilibrium approaches work surprisingly well.

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