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Observation of the Disorder-Induced Crystal-to-Glass Transition
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— The role of frustration and quenched disorder in driving the transformation of a crystal into a glass is investigated in quasi-two-dimensional binary colloidal suspensions. Frustration is induced by added smaller particles. The crystal-glass transition is measured to differ from the liquid-glass transition in quantitative and qualitative ways. The crystal-glass transition bears structural signatures similar to those of the crystal-fluid transition: at the transition point, the persistence of orientational order decreases sharply from quasi-long-range to short-range, and the orientational order susceptibility exhibits a maximum. The crystal-glass transition also features a sharp variation in particle dynamics: at the transition point, dynamic heterogeneity grows rapidly, and a dynamic correlation length-scale increases abruptly.

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