

Abstract Submitted
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Glass-like dynamics of a structural colloidal crystal in a disordered potential landscape¹ KEVIN APTOWICZ, West Chester University of Pennsylvania, TIM STILL, MATTHEW GRATALE, YE XU, ARJUN YODH, University of Pennsylvania — Disordered solids exhibit a boson peak at low frequencies, where many more modes appear than is expected for sound modes behavior. The origin of the boson peak remains unclear, although two explanations have risen to the forefront: (i) the boson peak is composed of quasi-localized modes arising from peculiarities of the interatomic forces in amorphous materials and (ii) the boson peak is the amorphous equivalent of the Van Hove singularity in crystalline systems. We experimentally explore these two possible explanations by studying a quasi-two-dimensional colloidal structural crystal residing in a disordered potential landscape. The potential landscape is generated by non-uniform heating of the sample. Thermophoretic effects lead to a heterogeneous force distribution that is tunable with temperature. With this experimental geometry, we explore the evolution of the density of vibrational states as a function of the strength of the disorder potential landscape.

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