

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Local strain fields in two-dimensional colloidal crystals with bond strength disorder¹ MATTHEW GRATALE, YE XU, TIM STILL, ARJUN YODH, Department of Physics and Astronomy, University of Pennsylvania — We study the local strain fields of two-dimensional colloidal crystals consisting of random distributions of hard polystyrene particles and soft microgel particles. Using standard video microscopy and particle tracking techniques, we analyze the variations of local configurations around each particle due to thermal motion. With this information we derive the best-fit affine strain tensor and the non-affinity for each particle in the sample, which allow us to study the mechanical properties of our colloidal crystals. We then observe the changes in these properties as we transition from a predominately hard-sphere crystal to predominately soft-sphere crystal, that is we explore how the mechanical properties are affected by replacing hard inter-particle bonds with soft inter-particle bonds.

¹We gratefully acknowledge financial support from the National Science Foundation through DMR12-05463, the PENN MRSEC DMR11-20901, and NASA NNX08AO0G.

Matthew Gratale
Department of Physics and Astronomy, University of Pennsylvania

Date submitted: 09 Nov 2012

Electronic form version 1.4