

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Density of States in 2D Colloidal Systems¹ KE CHEN, Department of Physics and Astronomy, University of Pennsylvania, WOUTER ELLENBROEK, ZEXIN ZHANG, NING XU, PETER YUNKER, ANDREA LIU, ARJUN YODH — The vibrational density of states (VDOS) of particles in a two-dimensional binary colloidal system was investigated using video microscopy. NIPA particles, whose diameters can be tuned by small temperature variations, were loaded into parallel-plate microscope cells, and their motions tracked with video microscopy. This approach permits in-situ observation over a wide range of particle packing fractions, from colloidal fluids to highly-compressed colloidal glasses well above random close-packing density. Using displacement correlation matrix, we extracted the vibrational modes from the ‘shadow system’ of **undamped** particles with the same interactions in the same configurations. At densities above the jamming transition, we find vibrational modes in excess of the Debye prediction, which shift upwards in frequency with compression. At low frequencies, these modes are quasi-localized, in agreement with recent predictions.

¹This work is supported by NSF DMR-080488, MRSEC DMR-0520020

Ke Chen
Department of Physics and Astronomy, University of Pennsylvania

Date submitted: 19 Nov 2009

Electronic form version 1.4