

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Measurement of Colloidal Interactions Using Holographic Microscopy and Multi-particle Scattering Theory KRISTOPHER ERIC MARTIN, University of California, Santa Barbara, JEROME FUNG¹, VINOOTHAN MANOHARAN², Harvard SEAS — Holographic microscopy provides the ability to record particle information in three dimensions with rapid time resolution. Single-particle scattering theory has been used to interpret holographic images of single colloids and provide highest available resolution for imaging single colloids in three dimensions. This method, however, has yet to be employed to interpret images of multiple colloids. We demonstrate the implementation of a multiple-particle generalization of Lorenz-Mie scattering solution to interpret holographic images of clusters of spherical colloids. Highly precise theoretical holograms of multiple spherical colloids are calculated using the multiple-particle scattering theory, and recorded holographic images of colloidal clusters are fit to those of the theoretical method. The parameters of the fitting routine are used to characterize colloids' sizes, indices of refraction and separation radii, amongst other properties.

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Date submitted: 27 Nov 2009

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