

Abstract Submitted
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Direct measurement of short range colloidal interactions using digital holographic microscopy¹ REBECCA W. PERRY, Harvard University, Sch. of Engineering and Applied Sciences, JEROME FUNG, DAVID M. KAZ, GUANGNAN MENG, Harvard University, Dept. of Physics, VINOTHAN N. MANOHARAN, Harvard University, Dept. of Physics and Sch. of Engineering and Applied Sciences — Using digital holographic microscopy, we record the 3D positions of micron-sized polystyrene particles as they approach and retreat from each other. Analysis of the holograms using an exact solution for the scattering from pairs of spheres allows us to separate vibrational, translational, and rotational motion. The vibrational mode supplies the information needed to characterize the inter-particle interactions down to separation distances on the order of 10 nm. In particular, we study an aqueous system of one micron diameter sulfate-coated polystyrene beads suspended in a solution of 95 nm hydrogel particles. The attractive depletion interaction we measure deviates from the Asakura-Oosawa model, likely because of electrostatic interactions at these short distances.

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