Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Structures formed by colloidal particles on a droplet at small particle number JEROME FUNG, RYAN J. MCGORTY, Harvard University, Dept. of Physics, VINOTHAN N. MANOHARAN, Harvard University, Dept. of Physics and SEAS — We discuss 3D imaging studies of the self-assembled structures formed by small numbers ($N \sim 10$) of micron-sized polymethylmethacrylate (PMMA) colloids pinned to the surface of a $\sim$10 micron oil droplet in an aqueous solution. In the low N limit, these structures are governed by the interactions between the constituent colloidal particles on a given droplet. We prepare these droplets using a capillary microfluidic device. Since the droplets are not density matched to the continuous phase, we study them with a time-averaged zero gravity apparatus, based on a rotary stage. Specifically, we image the 3D structures formed by the colloidal particles on the droplets using digital holographic microscopy (DHM). DHM records the 2D interference patterns, or holograms, formed by light scattered from the colloidal particles and unscattered light. Subsequent analysis of the holograms, based on the Lorenz-Mie solution for light scattering by spheres, allows us to determine the 3D particle positions with time resolution limited by the camera frame rate.

Jerome Fung
Harvard University, Dept. of Physics

Date submitted: 21 Nov 2008 Electronic form version 1.4