Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Controlling Heap Formation in Microsphere Suspensions CARLOS ORTIZ, KAREN DANIELS, ROBERT RIEHN, North Carolina State University — We explore how the formation of heaps of microspheres depends on the relative magnitudes of hydrodynamic, surface, and thermal forces. We assemble a heap of sub-micron polystyrene spheres by pumping a dilute ($\phi < 10^{-3}$) suspension towards a barrier in a microchannel. We map out a phase diagram to locate the heap-forming regime as a function of incoming bead velocity, controlled by driving pressure, and barrier surface charge, controlled by buffer conditions. As the barrier surface charge increases, the long-range repulsive normal force between the microspheres and the surface increases, causing the minimum driving pressure needed to form a pile to increase. We measure the static and dynamic properties of the heap as a function of system parameters.

Carlos Ortiz
North Carolina State University

Date submitted: 01 Aug 2011 Electronic form version 1.4