Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Anomalous Rotation of a Pair of Spherical Particles in AC Electric Fields PUSHKAR LELE, ERIC FURST, University of Delaware — Suspensions of colloidal particles are observed to form angled bands and vortices near surfaces in AC electric fields. We map the critical frequencies and field biases at which particles phase separate in to bands and the vortices gradually set in. The results from such mapping experiments are interpreted based on measurements of anomalous rotation on a pair of colloidal particles held in blinking optical tweezers. Our observations suggest that particle pair rotation is the characteristic motion in vortices and that the polarization of double layer around the particles influences the angular velocity of the vortex revolution. Increasing the electrolyte concentration of the medium or the frequency of the electric field results in reduction of the rotation. Based on these results, the suspension behavior can be "tuned" by changing the ionic strength, field strength, field frequency and particle size.

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Date submitted: 04 Dec 2007 Electronic form version 1.4