Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Determination of Charge Interactions of Nanoparticles by Optical Trapping JOSEPH JUNIO, H.D. OU-YANG, Lehigh University — We report an experimental study of interactions in colloidal nanoparticles through optical trapping. Using an optical trap with a size much larger than the trapped particles, we were able to create an optical bottle to confine and concentrate the nanoparticles. We measured the highly focused light-induced particle density fluctuation with confocal fluorescent detection. A theory based on a balance between the optical trapping radiation pressure and the osmotic pressure has been developed to calculate the isothermal osmotic compressibility from the forced density fluctuation. The measured osmotic compressibilities of colloidal crystals are then used to determine the surface charge density of the colloidal particle(1). Comparison of the experimentally determined charge density is compared to t determined by zeta potential measurements. (1)S. Alexander, P. M. Chaikin, P. Grant, G. J. Morales, and P. Pincus, D. Hone, Charge renormalization, osmotic pressure, and bulk modulus of colloidal crystals: Theory, J. Chem. Phys. 80, 5776 (1984)

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Date submitted: 20 Nov 2008 Electronic form version 1.4