Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Orthogonal Tracking Microscopy for Nanofabrication Research MATTHEW MCMAHON, ANDREW BERGLUND, PETER CARMICHAEL, JABEZ MCCLELLAND, J. ALEXANDER LIDDLE, National Institute of Standards and Technology — Constructing 2D lateral particle trajectories from digital video sequences of nanoparticle motion in a liquid is straightforward and fairly common, requiring only the use of centroid-finding algorithms. On the other hand, extracting particle trajectories in the third (out-of-plane) dimension has been more difficult, requiring detailed calibration of the radius of the defocused diffracted rings which result from vertical fluctuations of particle position. We introduce a new technique, termed orthogonal tracking microscopy or orthogonal projection microscopy, in which integrated micromirrors produce one or more reflected images of a particle within the same field of view as the direct image. The reflected images project vertical motion into lateral motion. Thus, we are able to construct a fully 3D particle trajectory from 2D digital video using only centroid-finding algorithms. We use this technique to study particle-surface interactions relevant to directed assembly of nanoparticles.

Matthew McMahon
National Institute of Standards and Technology

Date submitted: 19 Nov 2007 Electronic form version 1.4