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Dynamics of nanoparticles in an Optical Trap studied by Fluorescence Correlation Spectroscopy YI HU, H.D. OU-YANG, Lehigh University — This paper reports the results of an experiment that combined fluorescence correlation spectroscopy (FCS) and optical trapping to study the dynamic behavior of nanoparticles in a potential well. Using FCS, we were able to measure the enhanced nanoparticle concentration as a function of optical trapping intensity. Quantitative analysis of this increased density using a balance of inward radiation and outward osmotic pressures permitted the determination of the trapping energy per individual nanoparticle. The values for the trapping energy agreed with those found from a diffusion analysis of the optical trapping-elongated residence times of particles in the focal region. With these self-consistently determined trapping energies, we were able to rescale the trapping power into radiation pressure and calculate the osmotic compressibilities for different sized nanoparticle systems.

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