Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Precision Spectroscopy of Nanoparticles[1] FRANK LI, ROBERT SCHAFER, CHING-TING HWANG, STEVEN RUGGIERO, CAROL TANNER, University of Notre Dame — We describe a new approach for characterizing nanoparticles in suspension using laser transmission spectroscopy. Our apparatus precisely measures light transmission as a function of wavelength from the near UV to the near IR. The transmittance versus wavelength is inverted using a theoretical model to obtain particle size, geometry, and density information. The precision of our measurements allows us to determine both the particle size distribution and the absolute number of particles with diameters ranging of ∼5 nm to ∼3000 nm with ∼1 nm resolution. The size range of applicability is comparable to that of dynamic light scattering, but with approximately six orders of magnitude higher sensitivity (down to ∼1000 particles/mL). The technique also allows us to determine the length and width of rod shaped particles including biological objects. We will present results for a variety of systems including metal, polystyrene, and metal-oxide particles, and organisms including viruses and bacteria.

[1]Supported by the Office of Research, College of Science, and Department of Physics at the University of Notre Dame.

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Date submitted: 25 Jan 2010 Electronic form version 1.4