Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Development and Characterization of Dynamic Light Scattering Instrumentation to Determine the Size of ZnO Nanoparticles[1] CHRISTOPHER DI FATTA, JEFFERY R. SIMPSON, Department of Physics, Towson University, Z. THOMPSON, M. SCHULZE , Towson University, S. M. LEV, Urban Enviromental Biogeochemistry Laboratory (UEBL) — Dynamic Light Scattering (DLS) serves as a useful tool for characterizing nanoparticles (NP) and molecules. DLS provides a high-throughput and accurate measurement of particle sizes for monodisperse (MD) spherical NPs. We are presenting the development and characterization of DLS instrumentation to measure the size of MD NPs, including ZnO. A HeNe and Argon ion laser comprise the excitation sources for the scattering experiment. We have evaluated avalanche photodiode and thermoelectrically-cooled photomultiplier tube detectors for the acquisition of the scattered light. We will determine the translational diffusion coefficient using time averaging and time-autocorrelation electronics. Considering the NPs to be MD spheres, we can determine the radius from the diffusion coefficient. ZnO NPs will be synthesized using several techniques and compared to those produced commercially. The synthesized particles are expected to range in diameter from 200 nm down to 20 nm, however, in the presence of agglomerates once suspended may extend the upper size limit for particles in suspension to 1000 nm. We will compare the DLS results on ZnO NPs with additional techniques including AFM. After size characterization, the ZnO NPs will be employed in ongoing toxicity studies in the UEBL.

[1]C. Di Fatta acknowledges support from the Fisher College of Science and Mathematics and Undergraduate Research Committee

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Date submitted: 09 Nov 2012 Electronic form version 1.4