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Development and Characterization of Dynamic Light Scattering Instrumentation to Determine Nanoparticle Size[1] T.J. SEBASTIAN, J. HARDING, T. VOLPE, J.R. SIMPSON, M. SCHULZE, S.M. LEV, Towson Univ — Dynamic Light Scattering (DLS) provides a high-throughput and accurate measurement of particle sizes for monodisperse (MD) spherical nanoparticles (NPs). We report on the development and characterization of homebuilt DLS instrumentation to measure the size of MD NPs of gold, polystyrene, and ZnO. HeNe and Argon-ion laser comprise the excitation sources for the scattering experiment. We have evaluated an avalanche photo-diode detector for the acquisition of scattered light. Time averaging and time-autocorrelation electronic signal detection and analysis provides a measure of the translation diffusion coefficient, which for MD and spherical particles allows for the determination of the NP radius. We have tested our apparatus using commercially-produced gold NPs in the range of 10 nm to 200 nm and synthesized ZnO NPs. DLS measurements were compared to those obtained by Atomic Force Microscopy (AFM). After size characterization, the ZnO NPs will be employed in ongoing toxicity studies.

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