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Development and Characterization of Dynamic Light Scattering Instrumentation to Determine Nanoparticle Size SAM HARDING, JACOB HARDING, KATE HOLMAN, TJ SEBASTIAN, JEFF SIMPSON, Department of Physics, Astronomy, and Geosciences Towson University — 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 and polystyrene. HeNe and Ar-ion lasers comprise the excitation sources for the scattering experiment. An avalanche photodiode detects the scattered light and an autocorrelation card analyzes the signal to provide a measurement of the translational diffusion coefficient, which allows for the determination of NP diameter. We have tested our apparatus using commercially-produced gold NPs in the range of 10nm to 200nm. Given the strong temperature-dependence of the viscosity, periodic ambient temperature measurements were used to produce dynamic values for viscosity and hence minimize uncertainty in the determination of NP size. Additionally, we will compare our DLS results to NP size measurements obtained by Atomic Force Microscopy (AFM). S.H., K.H., T.J.S. and J.H. acknowledge support from Towson University. J.R.S. acknowledges support from NSF - CBET #1236083.

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