Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Coherent Rayleigh-Brillouin scattering for in situ detection of nanoparticles and large molecules in gas and plasma[1] A. GERAKIS, PPPL, M.N. SHNEIDER, Princeton University, B.C. STRATTON, PPPL, B. SANTRA, R. CAR, Princeton University, Y. RAITSES, PPPL — Laser-based diagnostics methods, such as Spontaneous and Coherent Rayleigh and Rayleigh-Brillouin scattering (SRBS and CRBS), can be used for in-situ detection and characterization of nanoparticle shape and size as well as their concentration in an inert gas atmosphere [1]. We recently developed and tested this advanced diagnostic at PPPL. It was shown that the signal intensity of the CRBS signal depends on the gas-nanoparticle mixture composition, density and the polarizabilities of the mixture components [2]. The measured results agree well with theoretical predictions of Refs [1,2]. In this work, we report the application of this diagnostic to monitor nucleation and growth of nanoparticles in a carbon arc discharge. In support of these measurements, A time-dependent density functional theory was used to compute the frequency-dependent polarizabilities of various nanostructures in order to predict the corresponding Rayleigh scattering intensities as well as light depolarization [3]. Preliminary results of measurements demonstrate that CRBS is capable to detect nanoparticles in volume. 1. M. N. Shneider, S. F. Gimelshein, Appl. Phys. Lett. 102, 173109 (2013). 2. A. Gerakis, M.N. Shneider, B.C. Stratton, submitted to Appl. Phys. Lett. (2016). 3. B. Santra, M. N. Shneider, R. Car , to be submitted

[1]This work was supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division

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Date submitted: 10 Jun 2016 Electronic form version 1.4