replacing GEC16-2016-000509.

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Applying a laser-induced incandescence (LII) diagnostic to monitor nanoparticle synthesis in an atmospheric plasma, *in situ*[1] SHURIK YATOM, JAMES MITRANI, Princeton Plasma Physics Lab, YAO-WEN YEH, MIKHAIL SHNEIDER, Princeton University, BRENTLEY STRATTON, YEVGENY RAITSES, Princeton Plasma Physics Lab — A DC arc discharge with a consumed graphite anode is commonly used for synthesis of carbon nanoparticles, including carbon nanotubes (CNTs) and graphene flakes [1-3]. The graphite electrode is physically vaporized by high currents (20-60 A) in a buffer gas at 100-600 torr, leading to nanoparticle synthesis in a low temperature (>1 eV), plasma. Utilizing arc plasma synthesis technique has resulted in the synthesis of higher quality nanomaterials [3]. However, the formation of nanoparticles in arc discharge plasmas is poorly understood. A particularly interesting question is where in the arc the nanoparticles nucleate and grow. In our current work we show the results of studying the formation of carbon nanotubes in an arc discharge, *in situ*, using laser-induced incandescence (LII). The results of LII are discussed in combination with *ex situ* measurements of the synthesized nanoparticles and modeling, to provide an insight into the physics behind nanoparticle synthesis in plasma. 1. C. Journet *et al. Nature* **388**, 756-8 (1997); 2. A. J. Fetterman *et al. Carbon* **46** 1322-6 (2008); 3. M. Keidar *et al. Phys. Plasmas* **17**, 057101 (2010);

[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