Abstract Submitted
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Laser-induced incandescence diagnostic for *in situ* monitoring of nanoparticle synthesis in an atmospheric plasma[1] JAMES MITRANI, PPPL, Princeton University, SHANE PATEL, Rutgers University, MIKHAIL SHNEIDER, Princeton University, BRENT STRATTON, YEVGENY RAITSES, PPPL — A DC arc discharge with a consumed graphite electrode is commonly used for synthesis of carbon nanoaparticles in a low temperature (0.1 – 1 eV), atmospheric pressure plasma. The formation of nanoparticles in this plasma is poorly understood; it is not clear where nanoparticles nucleate and grow in the arc discharge. Therefore, a laser-induced incandescence (LII) diagnostic for *in situ* monitoring of the nanoparticles' spatial distribution in the plasma is currently being constructed. The LII diagnostic involves heating the particles with a short-pulsed laser, and measuring the induced spatiotemporal incandescence profiles on longer timescales. By appropriately modeling the induced spatiotemporal incandescence profiles, one can measure particle diameters and volume fraction. LII diagnostics have been extensively used to study soot particles in flames. However, they have never been applied in a strongly coupled plasma background. Even though the spatial dimensions for soot and nanoparticles are similar, great care is needed in developing an LII diagnostic for monitoring nanoparticles in a plasma background. Therefore, we will calibrate our LII diagnostic by measuring spatiotemporal incandescence profiles of known, research grade soot and nanoparticles.

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