Abstract Submitted
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Coagulation of carbon nanoparticles in the acoustic field in the vicinity of the arc discharge[1] MIKHAIL SHNEIDER, Princeton University — An arc discharge produced in a background inert gase between graphite electrodes is one of the popular methods of nanoparticle synthesis. Nanoparticles and microscopic soot particles are produced in the peripheral region of arc. Intensive soot generation significantly reduces the efficiency of the arc as the technological process for production of fullerenes and other nanoparticles. Experimental studies have shown that exposure of peripheral region of the arc to intense ultrasound leads to a noticeable increase in the efficiency of the nanoparticle synthesis and reduces the soot yield (see, e.g. [1]), because ultrasound causes coagulation of soot particles and decrease of their concentration without affecting the nanoparticles. The paper presents theoretical study of the threshold for the ultrasound intensity required for the coagulation as a function of particle sizes and charge, and background gas parameters. The charge acquired in a thermionic emission, as a result of particles heating by radiation from the arc, is calculated self-consistently [2,3]. I would like to thank Dr. Yevgeny Raitses, Dr. Igor Kaganovich, and Mr. James Mitrani for their interest in this work and fruitful discussions. 1. G.N. Churilov, Nanotubes and Carbon Nanostructures 16, 5-6, 395-403 (2008). 2. M.N. Shneider, Physics of Plasmas 22, 073303 (2015), 3. M.N. Shneider, AIAA 2016-1693, 54th AIAA Aerospace Sciences Meeting, San Diego, CA, 2016.

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