

Abstract Submitted
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Measurements of electric potential in a collisional plasma generated by the carbon arc¹ NIRBHAV CHOPRA, YEVGENY RAITSES, Princeton Plasma Physics Laboratory — In an atmospheric pressure anodic carbon arc discharge used for nanomaterial synthesis, carbon material is introduced into the arc by the ablation of the graphite anode [1]. The anode ablation depends on the power balance at the anode, which is influenced by whether the anode sheath is electron-repelling (negative anode sheath) or electron-attracting (positive anode sheath) [2, 3]. In this work, we attempt to determine the anode sheath sign by measuring the floating potential in the arc using a fast swinging Langmuir probe. The plasma potential is deduced from the floating probe measurements. The effect of arc motion on the measured probe potential is taken into account by correlating the measured probe potential with fast-frame images. The effect of ion-neutral collisions on the probe floating potential is considered in the determination of the plasma potential [4]. [1] A. J. Fetterman, Y. Raitses, and M. Keidar. *Carbon*, 46, 2008. [2] V. A. Nemchinsky and Y. Raitses. *Plasma Sources Sci. Technol.*, 25, 2016. [3] A. Khrabry, I. D. Kaganovich, V. Nemchinsky, and A. Khodak. *Phys. Plasmas*, 25, 2018. [4] P. Bryant. *J. Phys. D: Appl. Phys.*, 36:2859, 2003.

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