

Abstract Submitted
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Using Absolutely Calibrated Optical Emission Spectroscopy to Quantify Helium Metastables in a Microscale APPJ BRAYDEN MYERS, KATHARINA STAPELMANN, North Carolina State University — In atmospheric pressure plasma jets (APPJs) ignited in helium, electrons can collide with ambient helium atoms to form metastable states with an energy well above the ground state. These helium metastables can be of considerable significance, especially in discharges operating in the absence of a molecular precursor [1]. To examine the production and importance of helium metastables in a micro-scale APPJ, a COST Reference Jet [2] was investigated using absolutely calibrated optical emission spectroscopy (OES). The emission of two rotational bands of nitrogen – $N_2(C-B)$ and $N_2^+(B-X)$ – was used to determine the relative contribution of helium metastables for a variety of discharge parameters. Additionally, small amounts of a molecular precursor were added to the feed gas to identify a transition point where the role of helium metastables could be considered negligible. [1] K Niemi et al 2011 Plasma Sources Sci. Technol. 20 055005 [2] J Golda et al 2016 J. Phys. D: Appl. Phys. 49 084003

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