

Abstract Submitted  
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**Characterization and optimization of the HyperV PLX- $\alpha$  coaxial-gun plasma jet**<sup>1</sup> ANDREW CASE, SAM BROCKINGTON, EDWARD CRUZ, F. DOUGLAS WITHERSPOON, HyperV Technologies — We present results from characterizing and optimizing performance of the contoured gap coaxial plasma guns under development for the ARPA-E Accelerating Low-Cost Plasma Heating And Assembly (ALPHA) program. Plasma jet diagnostics include fast photodiodes for velocimetry and interferometry for line integrated density. Additionally we present results from spectroscopy, both time resolved high resolution spectroscopy using a novel detector and time integrated survey spectroscopy, for measurements of velocity and temperature as well as impurities. Fast imaging gives plume geometry and time integrated imaging gives overall light emission. Results from a novel long record length camera developed by HyperV will also be presented. Experimental results are compared to the desired target parameters for the plasma jets. The target values for the plasmoid are velocity of 50 km/s, mass of 3.5 mg, and length of 10 cm. The best results so far from the exploration of parameter space for gun operation are:  $\sim 4$  mg at  $>50$  km/s, with a length of 10 cm. Peak axial density 34 cm downstream from the muzzle is  $\sim 2 \times 10^{16} \text{ cm}^{-3}$ .

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