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Characterization of a streamer-initiated atmospheric pressure plasma jet for spatially guided pulsed plasma generation BRIAN SANDS, UES, Inc., BISWA GANGULY, Air Force Research Laboratory — We examine the characteristics of a streamer-initiated atmospheric pressure plasma jet (APPJ) terminated by a cathode ground plane in air. The plasma jet is generated using a 12 kV submicrosecond voltage pulse exciting a single positively biased electrode wrapped around a 3 mm diameter glass capillary with a 2 slm, 5% Ar/He mixture, gas flow. This APPJ device is distinguished from flow-driven APPJs by its ability to generate excited species *in situ* over its length. The presence of the cathode downstream provides ionization gain that is not characteristic of flow-driven APPJs in similar configurations but rather is characteristic of a single dielectric barrier microdischarge filament that is confined to the capillary axis. With a conducting cathode, this discharge filament can carry several Amps of current in a ∼30 ns pulse. In this experiment, we study this atmospheric pressure plasma source with cathode materials of varying resistivity including conducting metals, semiconducting silicon, and insulating dielectrics at distances up to 3 cm from the capillary tip. We monitored spatiotemporally resolved emission intensities from the Ar/He/air discharge to track the relative gain of electron impact excitation across the gap. This will be correlated with current and voltage measurements to estimate energy deposition in the gap.

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