

Abstract Submitted  
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**Synchronized Imaging and Spectroscopy of Atmospheric Pressure Plasma Bullets for Soft and Biomaterial Applications** RYAN GOTT, KUNNING XU, University of Alabama in Huntsville — Pulsed dc atmospheric pressure plasma jets are comprised of a series of fast moving plasma bullets. Plasma bullets are the front of ionization streamers and studying them can give insight to the characteristics of a plasma. In this work, the formation and lifetime of these bullets were observed using synchronized imaging with an ICCD camera. The bullets were studied at various voltages (6-10 kV), flow rates (1-6 slm), and pulse widths (500-2000 ns) to monitor changes in bullet velocity and distance traveled. The measured velocities of the plasma bullets were nonlinear for the lifetime of the bullet and were mainly dependent on voltage. Furthermore, an ICCD spectrometer was used to provide synchronized optical emissions spectroscopy measurements. The formation of reactive species such as OH and excited  $N_2$  ( $2+$ ) was observed at a nanosecond timescale. It was seen that OH forms only inside each bullet and rapidly dissipates after the bullet moves. The excited  $N_2$  species then form in the wake of the bullet and last for hundreds of nanoseconds. Observing the temporal formation of plasma bullets and reactive species allows us to understand how to tailor the plasma parameters for treatments of soft and biomaterials.

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