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**Control of excited species radial distribution through gas admixtures in an atmospheric plasma jet** ROBERT LEIWEKE, UES, Inc., SARAH TAYLOR, BISWA GANGULY, Air Force Research Laboratory — The radial distribution of excited species outside the capillary of a pure helium streamer-like discharge exhibits an annular morphology. Controlling the radial distribution of excited species beyond the capillary is beneficial for many applications. Intensity distribution control has been obtained using 1-3% admixtures of $O_2$, Ar, and $N_2$ flowing through a 4 mm ID capillary into ambient air at 1.6 SLM. Excitation used 20 ns rise time unipolar high voltage pulses at 11.5 kV and 6 kHz repetition rate. Spatiotemporally and spectrally resolved emission images from He $3^3D \rightarrow 2^3Po$, Ar $2p_1 \rightarrow 1s_2$, O $^5P \rightarrow ^5S$, and $N_2^+$ $B^2\Sigma \rightarrow X^2\Sigma$ were acquired along the propagation axis using a 5 ns gate ICCD camera. A fiber-couple PMT lens viewing normal to the propagation axis collected the same species emission in order to obtain streamer speeds and emission temporal profiles. Streamer currents were measured with Rogowski probes. For each admixture, the emission profile for each species peaks on axis with a mean FWHM of $\sim$1.5 mm. The streamer speed and current are nearly constant for the Ar dilution but, for the same corresponding $O_2$ dilution the streamer speed and current decrease by a factor of three. The emission intensities of all the transitions show a similar trend.

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