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Effects of Geometry and Excitation Frequency on Plasma Torch Temperature DOUGLAS SCOTT, IL GYO KOO, KAZUNARI SATO, CAMERON MOORE, GEORGE COLLINS, Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, Colorado 80523. — Temperatures of atmospheric pressure plasma jet effluent were measured spectroscopically in argon with 2% hydrogen under conditions of constant delivered power. Different inner diameters of the mm-size plasma tube, excitation frequencies from several MHz to $>$ 100 MHz, and gas velocities resulted in measurements that indicate each of these parameters strongly affect temperature of the effluent plume. The data suggest that energy either flows in the plume or two the tube wall: plume and tube temperature are complementary. We present a heat flow model and analysis that agrees with experimental data, and from these data we estimate the diameter of the plasma in the upstream tube. We also present spatially resolved measurements along the plasma axis.

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