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Ultraviolet Laser Raman Scattering for Temperature Measurement in Atmospheric Air Microdischarges JAMES CAPLINGER, STEVEN ADAMS, Air Force Research Laboratory, JAMES WILLIAMSON, UES Inc., JERRY CLARK, Wright State University — Vibrational Raman scattering for temperature measurement within a dc microdischarge in atmospheric pressure air has been investigated using a pulsed ultraviolet laser. The Raman signal analysis method involved monitoring Q-branch signals originating from multiple $N_2(X)$ vibrational states populated in the microdischarge. The translational temperature of $N_2(X)$ in the microdischarge was calculated using the total Raman signal intensity calibrated with room temperature air. Also, the distribution of Q-branch intensities among vibrational states allowed for direct measurement of the vibrational temperature of $N_2(X)$. Raman scattering results are compared to passive optical emission spectral analyses of the N_2 second positive system from which the rotational and vibrational temperatures of the $N_2(C)$ excited state were also calculated. A comparison of the $N_2(X)$ and $N_2(C)$ temperatures derived from Raman scattering and emission spectroscopy, respectively, is presented. This work was supported by the Air Force Office of Scientific Research.

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