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Turbulent Premixed Combustion in V-flames: Statistics of Flame Front Position SINA KHEIRKHAH, ÖMER GÜLDER, University of Toronto Institute for Aerospace Studies — Flame front characteristics of turbulent premixed V-flames were experimentally investigated using Mie scattering and particle-image-velocimetry techniques. Experiments were performed at three mean bulk flow velocities of 4, 6.2, and 8.6 m/s along with three fuel-air equivalence ratios of 0.7, 0.8, and 0.9. Effects of the vertical distance from the flame-holder, mean bulk flow velocity, and fuel-air equivalence ratio on statistics of the flame front position were studied. Results show that, mean and RMS of distance between the flame front and the vertical axis increase with increasing the vertical distance from the flame-holder. At a fixed vertical distance above the flame-holder, mean and RMS of the distance between the flame front and the vertical axis decrease with increasing the mean bulk flow velocity; however, these statistics increase with increasing the fuel-air equivalence ratio. Results show that probability-density-function of the distance between the flame front and the vertical axis features a bell-shaped distribution. Power spectral analysis of the flame front position shows that, for all experimental conditions tested, the averaged and normalized power-spectrum-densities of the flame front position collapse and show a power-law relation with the wave number.

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