TURBULENCE EFFECTS ON LEAN FLAME EXTINCTION

Lean flame blowout is induced upon a highly turbulent bluff-body stabilized flame to understand the intrinsic dynamic mechanisms of extinction. This is completed within a premixed blow-down combustion facility and captured utilizing high-speed optical diagnostic techniques, simultaneous PIV (Particle Image Velocimetry) and C2CH species. The turbulence intensity is altered using a impinging jet design that allows for variable intensity to be tested. Multiple turbulence intensities are evaluated for multiple velocity cases in order to determine the effect of turbulence upon the extinction mechanisms. Prior research has shown the detailed mechanisms of flame extinction upon a more laminar flame. It was shown that the flame-vortex interaction prompted a reduced flame-generated vorticity and a resulting increase in downstream shear layer vorticity. Frequency characteristics are gathered to analyze the changing instability modes as it varies with equivalence ratio.

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Approved for distribution by Kareem Ahmed, Committee Chair, on June 11, 2018.

The public is welcome to attend.