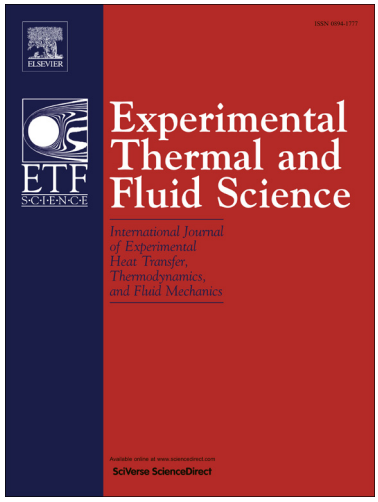

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Systematic Investigation of Premixed Methane/Air Turbulent Impinging Flames

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Abstract

Turbulent impinging flame dynamics were investigated using methane/air Bunsen flames with planar laser induced florescence (OH-PLIF), high-speed color imaging camera, thermal imaging camera and acoustic recording microphone as main measuring equipment. Also in this investigation, Digital Flame Color Discrimination(DFCD) and Fast Fourier Transform (FFT) methods were employed to complete the post process. The main aim of this paper is to investigate turbulent flame variations and their correlation with the temperature distribution across an impinging plate. Results showed that, the alteration in the plate-to-nozzle distance results in the variations in the radial temperature distribution and the flame shapes. OH-PLIF images and high speed flame images showed discernible changes on flame characteristics. Audible combustion noise was noticed and collected using Matlab controlled microphone, FFT results showed a strong correlation between combustion noise intensity and the impinging distance. From analyzing the relationship between flame images and flame burning noise, a crucial frequency of combustion noise was found.

Key Words: PLIF, DFCD, turbulent flame, impinging flame, acoustic noise, FFT

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