INVESTIGATION OF FLAME FRONT SHAPE IN A SWIRLING TURBULENT FLOW BY PLANAR LASER-INDUCED FLUORESCENCE OF FORMALDEHYDE

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Abstract: The paper reports on results of the experimental study of regions of local heat release in strongly swirling premixed methane/air turbulent flames. The measurements were carried out for the jet-flames with different equivalence ratios $\phi = 0.7$, 1.4, and 2.5) by using planar laser-induced fluorescence of formaldehyde, excited by laser radiation with 355-nanometer wavelength. Large-scale deformations of the flame front in turbulent swirling flow were detected. The shape of intense heat release region for a lifted flame of the fuel-rich mixture ($\phi = 2.5$) was found to be considerably different from that in the inverted flames for $\phi = 0.7$ and 1.4.

Keywords: swirling turbulent flame; planar laser-induced fluorescence of formaldehyde

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