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Measurement of Three-Dimensional Flame Structure by Simultaneous Dual-plane CH PLIF, Single-plane OH PLIF and Stereoscopic PIV TAKASHI UEDA, MASAYASU SHIMURA, Tokyo Institute of Technology, GYUNG-MIN CHOI, Pusan National University, MAMORU TANAHASHI, TOSHIO MIYAUCHI, Tokyo Institute of Technology — To investigate three-dimensional flame structures of turbulent premixed flame, dual-plane planar laser induced fluorescence (PLIF) of CH radical has been developed. The newly-developed dual-plane CH PLIF is combined with single-plane OH PLIF and stereoscopic particle image velocimetry (SPIV) to clarify the relation between flame geometry and turbulence characteristics. The laser sheets for OH PLIF and SPIV measurement are located at the center of two planes for CH PLIF. The separation between these two CH PLIF planes is selected to 500μm. The measurement was conducted in relatively high Reynolds number methane-air turbulent jet premixed flame. The experimental results show that various three-dimensional flame structures such as the handgrip structure, which has been shown by DNS, are included in high Reynolds number turbulent premixed flame. It was shown that the simultaneous measurement containing newly-developed dual- plane CH PLIF is useful for investigating the three-dimensional flame structure.

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