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**Assessment of PLIF-Based Heat Release Rate Markers using DNS of Highly Turbulent Premixed Flames** XINYU ZHAO, PEIYU ZHANG, University of Connecticut, TIMOTHY WABEL, ADAM STEINBERG, University of Toronto, HAIOU WANG, EVATT HAWKES, University of New South Wales
— Planar Laser Induced Fluorescence (PLIF) remains the most common measurement tool for describing turbulent flame topologies. However, the interpretation of the images obtained from such experiments can be obscured due to various experimental constraints, such as the finite laser thickness, the application of intensifier, etc. Synthetic-PLIF images are constructed in this study to understand the effects of various experimental reality using direct numerical simulations. Two DNS databases of highly turbulent premixed methane flames are employed, to generate the synthetic PLIF images. The thickness of the laser sheet and optical blur parameters are systematically varied to study their effects on the implied reactive layer thickness, topological correspondence with heat release rates, as well as the resolved scales of the flames. It is found that the optical blur can have a significant influence on the measured layer thickness, and significant discrepancy between the DNS and the synthetic PLIF arises when the laser thickness is approximately twice the size of the reactive layers.

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