

Abstract Submitted  
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**Laser-induced breakdown stabilization of non-premixed jet diffusion flames** MOON SOO BAK, MARK A. CAPPELLI, Stanford University — Laser-induced breakdown is used to stabilize non-premixed jet diffusion flames under co-flow conditions well exceeding flame blow-off. Our focus has been on methane, ethane, and propane in co-flowing air. The 23 mJ, 10 ns pulse width frequency doubled output from a 15 Hz repetition rate Nd: YAG laser is focused down by a lens to generate the plasma kernel. Gas chromatography is carried out at downstream locations to determine the extent of combustion. The same laser pulse is used to carry out laser-induced breakdown spectroscopy (LIBS) to characterize the fuel-air mixing and to obtain the local equivalence ratios in the flow. Effective stabilization is found for all of the tested fuels but only when the laser-produced plasma is generated in regions of the flow where the local equivalence ratio is around a critical value. With the use of a numerical simulation, we discuss the prospects of using distributed laser pulses for volume plasma filling and control of complex jet flames.

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