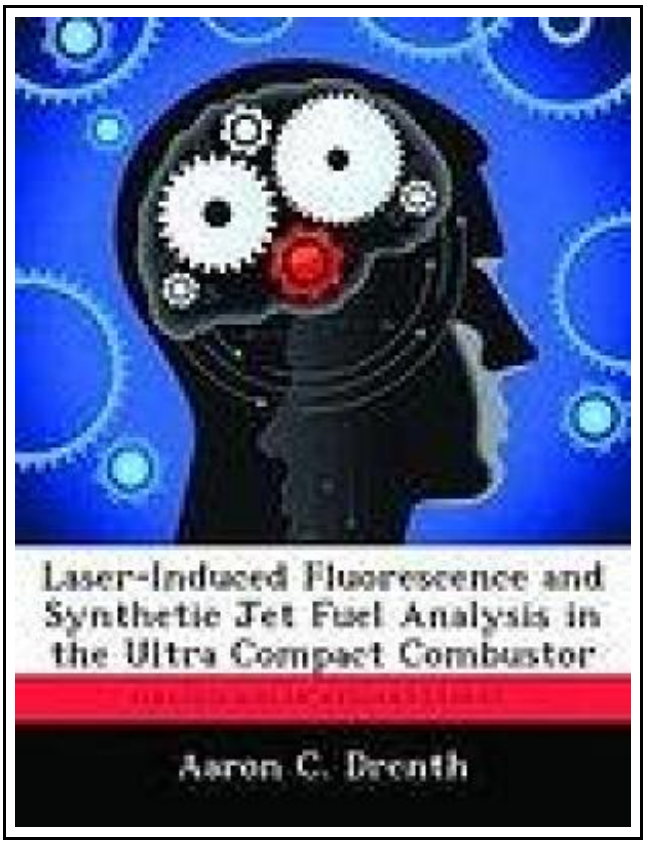
Laser-Induced Fluorescence and Synthetic Jet Fuel Analysis in the Ultra Compact Combustor



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(Dorothy Daugherty)

LASER-INDUCED FLUORESCENCE AND SYNTHETIC JET FUEL ANALYSIS IN THE ULTRA COMPACT COMBUSTOR

Biblioscholar Okt 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x10 mm. This item is printed on demand - Print on Demand Neuware - The Ultra Compact Combustor is currently under investigation at the Air Force Institute of Technology and Air Force Research Laboratory's Propulsion Directorate. This combustor is a small-scale, axi-symmetric, atmospheric pressure, laboratory combustor with an outer circumferential cavity in which the flame is stabilized by a highly accelerated swirled flow. This ultra-compact combustor (UCC) will enable aero gas turbine reheat cycle engines and significantly shorten conventional aero gas turbine engines. The experiments of this work utilized the AFIT small-scale combustion diagnostics facility, investigating a sector model of the UCC. The objectives of this research was to perform an addition to and validation of the COAL lab laser diagnostic system and to begin the characterization of a small-scale model of an UCC using hydrogen, and both traditional and synthetic jet fuels. Validation of the laser system was accomplished by using two-line planar laser induced fluorescence (PLIF) on a laminar premixed hydrogen-air flame produced by a Hencken burner. OH species concentrations were measured. Flame temperatures were determined with a two-line fluorescence technique using different transitions in the (1,0) band of the OH (A-X) electronic transition system. Comparisons are made to existing research to prove accuracy. Operational procedure of the Hencken burner and UCC were modified as necessary. The ignition system was modified and UCC starting conditions have been updated. Emissions data was collected using synthetic jet fuel and compared to traditional jet fuel. Future work will involve using PLIF to further study the cavity-vane interactions of the UCC. 166 pp. Englisch.

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