

COMBUSTION WEBINAR

A New Approach to Ignition: Minimum Ignition Power and Inter-pulse Coupling

Speaker: Prof. Joseph Lefkowitz, Technion – Israel Institute of Technology

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**COMBUSTION
WEBINAR**



Biography: Joseph Lefkowitz received a B.S. from Johns Hopkins University in 2009 and a Ph.D. from Princeton University in 2015 under the advisement of Prof. Yiguang Ju. He spent two years as an NRC Research Associate at the Air Force Research Laboratory (High-Speed Sciences Division) before joining the faculty of Aerospace Engineering at the Technion – Israel Institute of Technology in 2017. He is a Zuckerman Faculty Scholar, a recipient of the Hanin Prize for Young Researchers granted by the Technion Faculty of Aerospace Engineering, and a member of the editorial board of the scientific journal *Combustion and Flame*. His current research interests include ignition, plasma-assisted combustion, plasma chemical conversion of alternative fuels, hypergolic ignition of solid fuels, and infrared optical methods for sensing and imaging of reacting flows.

Abstract: The ignition of flowing reactive mixtures by electrical energy deposition is a topic of relevance in engines as varied as spark-ignition IC engines to gas turbines to scramjets. The development of ignition kernels from the energy deposition stage to full scale engine ignition ranges from the nanosecond to millisecond timescales and involves the kinetics and dynamics of coupled plasma and combustion phenomena. In this lecture, we will follow the recent progress of an effort to understand these processes using carefully controlled energy deposition by nanosecond-pulsed high-frequency discharges in a well-defined flow tunnel and in a scramjet engine. Discussions of the effects of multiple parameters, comparisons with other energy deposition sources, and temperature/species measurements by means of optical emission spectroscopy, infrared radiometry, and high speed OH-PLIF will be covered. The discovery of the minimum ignition power and the regimes of inter-pulse coupling for discreet energy deposition will be highlighted.

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