

Electric Field Effects on Laminar Diffusion Flames

Friday, February 8th
Bowen Hall Rm 222
12:30 PM



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Nearly all combustion research has the objective of maximizing efficiency or minimizing harmful emissions. This presentation describes our studies into the use of electric fields to potentially accomplish these goals. Hydrocarbon flames have long been known to contain naturally a small quantity of charged species that allow them to act as weak plasmas. Electric fields can therefore influence these flames, including changing their shape and direction, their sooting behavior, and their ignition limits. The presentation includes findings from our laboratory studies in 1-g and new results from our experiments in microgravity on the International Space Station as part of the NASA ACME combustion studies.

Derek Dunn-Rankin is Professor and Chair in the Department of Mechanical and Aerospace Engineering at the University of California, Irvine (UCI). He is co-Director for CAMP, the California Louis Stokes Alliance for Minority Participation, a program designed to increase minority representation in science and technology. Dr. Dunn-Rankin is treasurer for the International Combustion Institute, and his research is in novel concepts in combustion and energy, droplet and sprays, and applications of laser diagnostic techniques to practical engineering systems. He has been faculty advisor for 30 Ph.D. and 64 M.S. graduates at UCI. He received a Japan Society for the Promotion of Science Fellowship in 2008 and the Oppenheim Prize of the Institute for the Dynamics of Explosions and Reactive Systems in 2013.



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