

Combustion Modeling and Simulation: Recent Advances, Applications and Challenges

by

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Abstract:

Combustion as one of the oldest technologies known to man has been essential to the development of humankind. It currently provides 85% of the primary energy, intervenes in some of the most important industrial processes but also raises concerns as a source of greenhouse gases considered to be major contributors to climate change and pollutants that degrade the quality of air. Considerable efforts are expended to improve combustion processes, augment efficiency and reduce emissions. Much of these efforts are based on advanced combinations of theoretical analysis, detailed experimentation using modern laser diagnostics and high-speed imaging, physical modeling and simulations exploiting high performance computing capabilities. Starting with a list of central issues encountered in combustion science, this progress will be reviewed and challenges will be examined by describing specific examples of fundamental interest and practical importance: turbulent combustion modeling and simulation, dynamics of swirling flames, experiments and simulations of ignition and light-round of annular systems, combustion dynamics, cryogenic transcritical flames and computational flame dynamics.

This lecture mainly relies on research carried out at EM2C, CNRS with Drs. Nasser Darabiha, Benoît Fiorina, Denis Veynante, Daniel Durox, Thierry Schuller, Thomas Schmitt, Sébastien Ducruix, Ronan Vicquelin and with our former and current students Loyal Hakim, Jean-François Bourgouin, Maxime Philip and Kevin Prieur.

Aimed at a general audience, it will include introductory material and many illustrative examples and it will underline the link between knowledge and applications.

Date: 13 September 2017 (Wednesday)

Time: 4:30 pm

Venue: Connie Fan Multi-media
Conference Room
4/F, Cheng Yick-chi Building
City University of Hong Kong

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All are Welcome