OpenFOAM & Combustion Simulation

Modelling supersonic turbulent flames with uncertainty quantification

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Host: Prof. Bosen Wang (Beihang University)

Register: https://nus-sg.zoom.us/webinar/register/WN_L8Bl04VMSFmR9rZSNAh6Tg

Abstract

Combustion modeling is now playing an important role in the design and optimization of advanced propulsion devices. For high-fidelity simulation of supersonic turbulent flames, it is essential, though challenging, to resolve the highly nonlinear turbulence-chemistry interaction and to predict the near-limit combustion phenomena. This requires the accurate description of turbulent mixing as well as the use of detailed chemistry.

This talk will focus on presenting the progress on subgrid scalar mixing and chemistry acceleration in large eddy simulations of turbulent supersonic flames. In addition, the propagation of physiochemical uncertainties through active subspace will be demonstrated for turbulent flame simulations.

About the Speaker

Dr. Zhuyin Ren received his Ph.D. in Mechanical Engineering from Cornell University in 2006. He has been a Professor of the Center for Combustion Energy at Tsinghua University since 2013. Prior to that, he was a fluid specialist at ANSYS Fluent, a mechanical engineer at GE Global Research Center, and an assistant professor at the University of Connecticut. His research interests include turbulent combustion modeling and high-fidelity simulations with detailed chemistry. Dr. Ren has published over 100 SCI papers. Currently, he is an Associate Fellow of AIAA, associate editor of Journal of Propulsion and Power, and an editorial member of Combustion Theory and Modelling.