

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Differential diffusion modelling in transported PDF simulations of turbulent flames¹ ZHUYIN REN, Tsinghua University, HUA ZHOU, University of New South Wales, TIANWEI YANG, Tsinghua University — Honoring Ted O'Brien. The modelling strategy to incorporate differential diffusion effects in transported density function method (PDF), particularly in the context of large eddy simulation (LES) is proposed. Differential diffusion at the filter scale is resolved by the mean drift term in composition equations, while subgrid differential diffusion is modelled by the augmented mixing models that can account for differential mixing rates for each individual species. Both RANS/PDF and LES/FDF simulations of a jet-in-hot-coflow methane-hydrogen flame have been performed to investigate the effects of differential diffusion on flame characteristics.

¹This work is supported by National Natural Science Foundation of China 91841302 and 91441202.

Zhuyin Ren
Tsinghua University

Date submitted: 22 Jul 2019

Electronic form version 1.4