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Method of moments comparison for soot population modeling in turbulent combustion SHAO TENG CHONG, University of Michigan, HONG IM, King Abdullah University of Science and Technology, VENKAT RAMAN, University of Michigan — Representation of soot population is an important component in the efficient computational prediction of particulate emissions. However, there are a number of moments-based techniques with varying numerical complexity. In the past, development of such methods has been principally carried out on canonical laminar and 0-D flows. However, their applications in realistic solvers developed for turbulent combustion may face challenges from turbulence closure to selection of moment sets. In this work, the accuracy and relative computational expense of a few common soot method of moments are tested in canonical turbulent flames for different configurations. Large eddy simulation (LES) will be used as the turbulence modeling framework. In grid-filtered LES, the interaction of numerical and modeling errors is a first-order problem that can undermine the accuracy of soot predictions. In the past, special moments-based methods for solvers that transport high frequency content fluid with ability to reconstruct particle size distribution have been developed. Here, a similar analysis will be carried out for the moment-based soot modeling approaches above. Specifically, realizability of moments methods with nonlinear advection schemes will be discussed.

Shao Teng Chong
University of Michigan

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