

Event: European Combustion Meeting

Title: Application of the Shadow-Position Mixing Model to Large Eddy Simulation with the Eulerian subgrid Probability Density Function approach

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Abstract

The Shadow-Position Mixing Model (SPMM) accounts for scalar-localness of molecular mixing in transported Probability Density Function (PDF) simulations of turbulent flow, while maintaining correct turbulent dispersion behaviour. The SPMM was originally formulated in the context of the Lagrangian PDF implementation. Here, the SPMM is developed for use with the Eulerian PDF approach. After confirming consistency of behavior between the Lagrangian and Eulerian formulations in idealized one-dimensional test cases, we provide the first validation of any SPMM implementation against experimental measurements of a turbulent flame, in this case through Large Eddy Simulation of the Sandia D piloted turbulent jet flame. Compared to the less-sophisticated interaction by exchange with the mean mixing model, the SPMM model improves predictions of minor species and the scattering of composition in mixture fraction space, which is a measure of the localized extinction occurring in Sandia D.