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**An ODT-Based Flame-Embedding Approach for Turbulent Non-Premixed Combustion** SUMIT SEDHAI, TAREK ECHEKKI, North Carolina State University — A multiscale formulation is implemented to capture finite-rate chemistry in turbulent non-premixed flames. The formulation is based on a coupling of a large-eddy simulation (LES) solution for the transport of the filtered mixture fraction field and one-dimensional solutions embedded on the flame brush, which are tracked with the stoichiometric value of the filtered mixture fraction. The one-dimensional solutions are based on the one-dimensional turbulence (ODT) model. In the ODT solutions for the evolution of the reactive scalars, diffusion and reaction processes are implemented deterministically while LES subgrid scale advective transport have stochastic implementation. The ODT domains are allowed to be advected with the flow such that they remain attached to the flame brush. The formulation enables the implementation of effects that capture the fluctuations of reactive scalars within the LES grid, including finite-rate and non-equilibrium chemistry effects and radiation-turbulence interactions.

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