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**Large-Eddy simulation and measurements of turbulent mixing in a confined rectangular jet** JAMES HILL, BO KONG, MICHAEL OLSEN, RODNEY FOX, Iowa State University — Large-eddy simulations (LES) of a passive scalar were performed for a confined rectangular liquid jet ( $Re = 20,000$ ) and compared with the simultaneous particle image velocimetry (PIV) and planar laser induced fluorescence (PLIF) measurements. A finite-difference LES code was used to obtain velocity data, which was already proved to provide a very good agreement with PIV experiment data in the previous study. Both finite-difference and finite-volume formulation were used to discretize and solve the filtered scalar transport equation. The effects of numerical schemes and subgrid models on the LES results were investigated. Model validation was performed by comparing LES data for one-point statistics such as the passive scalar mean and variance, turbulence flux and probability distribution function with the PLIF data. In addition, LES data for the two-point spatial auto-correlations of passive scalar fluctuations and cross-correlations of passive scalar fluctuation and velocity fluctuations were also computed and compared with the simultaneous PIV and PLIF data.

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