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**Effect of LES models on the entrainment of a passive scalar in a turbulent planar jet** DIOGO CHAMBEL LOPES, CARLOS DA SILVA, RICARDO REIS, IST - Technical University of Lisbon, VENKAT RAMAN, UT Austin
— Direct and large-eddy simulations (DNS/LES) of turbulent planar jets are used to study the role of subgrid-scale models in the integral characteristics of the passive scalar mixing in a jet. Specifically the effect of subgrid-scale models in the jet spreading rate and centreline passive scalar decay rates are assessed and compared. The modelling of the subgrid-scale fluxes is particularly challenging in the turbulent/nonturbulent (T/NT) region that divides the two regions in the jet flow: the outer region where the flow is irrotational and the inner region where the flow is turbulent. It has been shown that important Reynolds stresses exist near the T/NT interface and that these stresses determine in part the mixing and combustion rates in jets. The subgrid scales of motion near the T/NT interface are far from equilibrium and contain an important fraction of the total kinetic energy. Model constants used in several subgrid-scale models such as the Smagorinsky and the gradient models need to be corrected near the jet edge. The procedure used to obtain the dynamic Smagorinsky constant is not able to cope with the intermittent nature of this region.

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