

Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Scalar transport across the turbulent/non-turbulent interface in jets: Schmidt number effects¹ TIAGO S. SILVA, CARLOS B. DA SILVA, Inst Superior Tecnico (IST), IDMEC TEAM — The dynamics of a passive scalar field near a turbulent/non-turbulent interface (TNTI) is analysed through direct numerical simulations (DNS) of turbulent planar jets, with Reynolds numbers ranging from $142 \leq Re_\lambda \leq 246$, and Schmidt numbers from $0.07 \leq Sc \leq 7$. The steepness of the scalar gradient, as observed from conditional profiles near the TNTI, increases with the Schmidt number. Conditional scalar gradient budgets show that for low and moderate Schmidt numbers a *diffusive superlayer* emerges at the TNTI, where the scalar gradient diffusion dominates, while the production is negligible. For low Schmidt numbers the growth of the turbulent front is commanded by the molecular diffusion, whereas the scalar gradient convection is negligible.

¹The authors acknowledge the Laboratory for Advanced Computing at University of Coimbra for providing HPC, computing, consulting resources that have contributed to the research results reported within this paper. URL <http://www.lca.uc.pt>

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Date submitted: 21 Jul 2016

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