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The strain field across the turbulent/non-turbulent interface GERRIT ELSINGA, Delft University of Technology, RODRIGO TAVEIRA, CARLOS DA SILVA, IST- Technical University of Lisbon — The average flow velocity field associated to the local strain at the turbulent/non-turbulent (T/NT) interface is evaluated using existing Direct Numerical Simulations (DNS) of turbulent planar jets and shear free turbulence. The strain field is of interest as it sets the size of the smallest eddies at the interface (through the dissipation) and governs vorticity stretching, which contributes to the entrainment velocity. Moreover, a similar strain field analysis of the internal turbulence yielded shear layer structures, which appeared universal across different flows and representative of the small-scale features of turbulence. Hence, the principal strain axes provide a meaningful basis for comparing different flows and internal versus interface structure. The results for the T/NT interfaces reveal a shear layer structure separating larger scale motions on either side. The non-turbulent side is characterized by a saddle topology without vorticity, whereas the turbulent side shows a nearly uniform flow parallel to the layer. Thus the larger-scales in the flow not just only determine the interface surface area, but they directly affect the strain and vorticity stretching at the interface and thereby entrainment.

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