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Anisotropy of the scalar field downstream of a concentrated source in turbulent channel flow[1] LAURENT MYDLARSKI, McGill University, LUMINITA DANAILA, CORIA, Université de Rouen, ROBERT LAVERTU, W. L. Gore & Associates — The scalar field downstream of a concentrated line source in fully-developed, high-aspect-ratio turbulent channel flow is studied[2]. Such a flow was selected to isolate the role of the inhomogeneity, which is confined to only one direction (i.e., the wall-normal direction). The scalar under consideration is temperature and is measured by means of cold-wire thermometry. Small-scale statistics of the scalar field, with an emphasis on the scalar dissipation rate ($\langle\varepsilon_\theta\rangle$), are studied. The anisotropy of the different components of $\langle\varepsilon_\theta\rangle$ will be presented, as well as their downstream return to isotropy. A comparison with the experiments of Rosset et al.[3] indicates that the anisotropy $\langle\varepsilon_{\theta_y}\rangle/\langle\varepsilon_{\theta_x}\rangle$ downstream of a centreline source in channel flow is smaller that observed in turbulent plane jets.

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[2]R.A. Lavertu and L. Mydlarski, 2005. *J. Fluid Mech.*, **528**, p. 135.
[3]L. Rosset, P. Paranthoën, J.-C. Lecordier, and M. Gonzalez, 2001. *Phys. Fluids*, **13**, p. 3729.

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