Abstract Submitted
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The directional dependence of scalar mixing downstream of a concentrated source in turbulent channel flow[1] JASON LEPORE, LAURENT MYDLARSKI, McGill University — To determine the effect of an inhomogeneous turbulent velocity field on scalar mixing, the present work focuses on the directional dependence of scalar fields in inhomogeneous turbulence. The scalar field under consideration is that generated downstream of concentrated line sources in fully-developed, high-aspect-ratio turbulent channel flow. The latter is the simplest realization of an inhomogeneous flow because the inhomogeneity is confined to only one direction. The work is performed by i) measuring the scalar field emitted by a line source oriented *normal* to the channel walls, and ii) comparing these results with previous research[2] studying the scalar field downstream of a line source oriented *parallel* to the channel walls. Given that the flow is inhomogeneous, the results of i) – pertaining to the "lateral" dispersion – must differ from those of ii), which pertain to the "transverse" dispersion. The scalar (temperature) field is generated by heating fine wires that traverse the channel and is measured by means of cold-wire thermometry. The downstream evolution of statistical moments and probability density functions will be compared to reveal the directional dependence of the scalar dispersion.

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[2]R.A. Lavertu and L. Mydlarski, 2005. *J. Fluid Mech.*, **528**, p. 135

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