

Abstract Submitted
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Geometric Skewness in the Passive Tracer Problem¹

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RICHARD MCLAUGHLIN, UNC Chapel Hill — The classic work by G.I. Taylor
describes the enhanced longitudinal diffusivity of a passive tracer in laminar pipe
flow. Much work since then has gone into extending this result particularly in cal-
culating the evolution of the scalar variance. However, less work has been done to
describe the asymmetry of the distribution. We present the results from a modeling
effort for the general picture of how the higher moments of the tracer distribution
depend on geometry. We do this via analysis of “channel-limiting” geometries (rect-
angular ducts and elliptical pipes parameterized by their aspect ratio), using both
new analytical tools and Monte-Carlo simulation, which have revealed a wealth of
nontrivial behavior of the distributions at short and intermediate time.

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