

Abstract Submitted
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Reynolds number dependence of thermal diffusion from a line source in decaying grid turbulence ERIKA JOHNSON, ZELLMAN WARHAFT, Cornell University — Existing experiments on line source dispersion in isotropic turbulence are for low Reynolds numbers (Taylor scale Reynolds numbers of less than 100) and there has been no attempt to systematically vary the Reynolds number. Here we present new results of passive temperature fluctuations produced by a fine heated wire in decaying grid turbulence. The Taylor Reynolds number is varied from approximately 50 to 500 by means of active and passive grids. We study the dependence of the mean and r.m.s. temperature profiles on the Reynolds number. The effects of source size are also investigated. The results are compared with the recent modeling work of Viswanathan and Pope (Physics of Fluids, to be published) who find significant Reynolds number dependence but small effects when varying the source size. The peak centerline ratio of the r.m.s. to the mean of the scalar is also examined and compared with predictions. This work is funded by the US National Science Foundation.

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