



74th Annual Meeting of the Division of Fluid Dynamics

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Presentation Type: Oral

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Sub-Category 36.11 Turbulence: Mixing

Abstract Title: Investigation of intermittency in scalar mixing from concentrated sources by way of higher-order spectral moments

The effect of intermittency on scalar mixing is investigated by way of higher-order spectral moments. The (hydrodynamic) flow under consideration is fully-developed turbulent channel flow and the scalar mixing within this flow is that generated by a concentrated line source within the flow. In this work, direct numerical simulations were undertaken by way of a spectral method to solve the equations of conservation of mass and momentum, and the advection-diffusion equation was solved using a flux integral method (Germaine et al.,

Abstract Body: *J. Comput. Phys.*, 2013). The intermittency of the scalar plume emitted by the concentrated line source is studied by way of higher-order spectral moments. Particular attention is paid to third- and fourth-order spectral moments, using the definitions formalized by Antoni (*Mech. Syst. Signal Process.*, 2006). Such statistics are sensitive to transients / non-stationarities, and thus provide insight into the intermittency of the scalar field.

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Category Type: Computational

Newsorthy Research? No

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