Abstract Submitted
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Fine structure symmetry-breaking in decaying passive scalars advected by laminar shear flow[1] FRANCESCA BERNARDI, University of North Carolina - Chapel Hill, MANUCHEHR AMINIAN, Colorado State University, ROBERTO CAMASSA, University of North Carolina - Chapel Hill, DANIEL HARRIS, Brown University, RICHARD MCLAUGHLIN, University of North Carolina - Chapel Hill, UNC JOINT APPLIED MATHEMATICS AND MARINE SCIENCES FLUIDS LAB TEAM — We investigate the dispersion of a passive scalar in laminar shear flow through rectangular and elliptical channels. We show through simulation, analysis and experiments that the cross-sectional aspect ratio sets the sign of the average skewness at long times, which describes the longitudinal asymmetry of the tracer distribution. We then extend the results to study the entire tracer distribution rather than only its longitudinal moments. With an analytical approach, we show that it is possible to describe the behavior of the tracer distribution at long time at any location in the cross-section, in turn highlighting the mechanism by which symmetry is broken. Future directions will be discussed.

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