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Scalings and statistics in shock-driven mixing flow[1] PETER VOROBIEFF, PATRICK WAYNE, SUMANTH REDDY LINGAMPALLY, C. RANDALL TRUMAN, University of New Mexico — Recent studies of shock-driven mixing in Richtmyer-Meshkov instability reveal that, as the flow transitions to turbulence and a mixing transition occurs, some statistical measures of the flow manifest values different from those one could expect from theory. One such statistical measure is the scaling of the second-order structure function of a scalar advected by the flow, in experiment, fluorescence intensity of a tracer tagging one of the gases undergoing mixing. Accordingly, this fluorescence intensity can be interpreted as local concentration of one of the species in the flow. We discuss possible reasons for the differences between experiments and theoretical predictions and present results describing the simultaneous evolution of the structure functions, mixing interface length and fractal dimension, and a histogram-based mixedness criterion. We also consider to what extent expectations driven by theories of fully-developed turbulence are applicable to a transitional flow that does not meet many idealized theoretical assumptions.

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