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Alignment of two-point statistics with respect to mean deformation field in anisotropic turbulent flows KHANDAKAR MORSHED, LAKSHMI DASI, Colorado State University — We study the variations in two-point correlation functions and second-order structure functions in the strongly anisotropic turbulent flow past a backward facing step. Time-resolved particle image velocimetry measurements were performed in a stationary turbulent flow past a backward facing step at Reynolds numbers 13,600, 9,000, and 5,500 based on the maximum velocity and step size. Measurements revealed a strongly anisotropic large-scale flow with an intense turbulent free-shear layer downstream of the step. Comparison among local two-point correlation functions and second-order structure functions at varying locations within the measurement domain reveals a mechanistic relationship between the magnitude of mean flow deformation field and the spatial organization of the two-point statistics in 360 degrees. It is shown that the local spatial variation in rms velocity significantly induces local anisotropy at arbitrarily small length scales.

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