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Turbulence Structure in Oscillating Channel Flow SEAN KEARNEY, JESSE ROBERTS, Sandia National Laboratories, JOSEPH GAILANI, US Army Corps of Engineers — The structure of turbulence in an oscillating channel flow with near-sinusoidal fluctuations in bulk velocity is investigated. Phase-locked particle-image velocimetry data in the streamwise/wall-normal plane are interrogated to reveal the phase-modulation of two-point velocity correlation functions and of linear stochastic estimates of the velocity fluctuation field given the presence of a vortex in the logarithmic region of the boundary layer. The results reveal the periodic modulation of turbulence structure between large-scale residual disturbances, relaminarization during periods of strong acceleration, and a quasi-steady flow with evidence of hairpin vortices which is established late in the acceleration phase and persists through much of the deceleration period.

Sean Kearney
Sandia National Laboratories

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