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Turbulent convection velocities in a turbulent boundary layer
ROELAND DE KAT, BHARATHRAM GANAPATHISUBRAMANI, University of Southampton — Turbulent convection velocities in a turbulent boundary layer are of crucial importance for bringing together theory and experiment. In this study, we determine probability density functions (*pdf*s) of turbulent convection velocities per wavenumber k_x –using a phase-spectral approach– from time-resolved PIV measurements in a stream-wise wall-normal plane of a turbulent boundary layer at $Re_\tau \approx 2700$. A field-of-view covering approximately $2 \times 0.5\delta$ with high spatial, $l^+ = 20$, and temporal resolution, $\Delta t^+ = 0.7$, allows us to determine convection velocities for a range of different wall-normal locations ($y/\delta : 0.02 - 0.47$; $y^+ : 60 - 1260$). The results indicate that the mode of the *pdf*s coincides with the local mean velocity and that there is a considerable spread around this mode. In the talk, a detailed description of turbulent convection velocities with wall-normal distance will be presented.

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