Vortex convection velocities in wall parallel planes of a turbulent boundary layer[1] JEFFREY A. LEHEW, MICHELE GUALA, BEVERLEY J. MCKEON, California Institute of Technology — The organization and convection velocity of vortices in wall parallel planes of a zero-pressure gradient turbulent boundary layer are investigated using time resolved digital particle image velocimetry (DPIV) at a moderate Reynolds number ($Re_\tau = 470$). Time resolved DPIV provides a means for tracking vortical structures in the flow giving their trajectories, velocities, and relation to other turbulent structures in the flow. Measurements are taken at three different wall normal locations ($y/\delta = 0.07$, 0.23, and 0.59) and comparisons of the vortex populations and convection velocities are made between the three planes. Vortical structures captured in these planes may be interpreted as signatures of hairpin-like structures which have been proposed to play a key role in turbulent boundary layer dynamics.

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