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**Measurements of spatio-temporal spectra in a zero-pressure gradient turbulent boundary layer** J. LEHEW, M. GUALA, B.J. MCKEON, Graduate Aerospace Laboratories, California Institute of Technology — The structure of the velocity field in wall-parallel planes in a zero pressure gradient turbulent boundary layer is interrogated using time-resolved digital particle image velocimetry at moderate Reynolds number ( $Re_\tau = 500$ ). In order to investigate turbulent boundary layer structure in light of the emerging understanding of the nature of very large scale motions (VLSMs), two high speed cameras are placed side-by-side to recover streamwise structures over ten times the boundary layer thickness in length, while still resolving the dissipative scales. The simultaneous spatial (streamwise and spanwise) and temporal joint spectra and correlations are used to investigate the validity of Taylor's hypothesis as the wall is approached, in light of the known significant wall normal extent of the VLSMs and the associated range of convection velocities.

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