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Investigation of coherent structures in rough and smooth wall boundary layers using tomographic PIV THOMAS CLARK, TIMOTHY NICKELS, University of Cambridge — While mean-flow universality can be seen in fully-rough walled turbulent boundary layers, spectral data of turbulence does not collapse in the same way. It is believed that spectral and mean flow properties can be explained by reference to coherent structures existing within boundary layers. The condition (i.e. roughness) of the wall may affect the formation mechanism(s) by which coherent structures occur, and therefore affect the turbulence spectra. Progress towards fully 3D, fully time resolved data revealing the formation dynamics is presented, with comparison between smooth and rough-walled cases at high Reynolds numbers. The limitations and advantages of the tomographic PIV technique are discussed, with especial reference to turbulent boundary layers.

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