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Full 3D derivative moments from an L-shaped SPIV experiment in the near wall region JEAN-MARC FOUCAUT, Ecole Centrale de Lille, CHRISTOPHE CUVIER, University of Lille, MICHEL STANISLAS, Ecole Centrale de Lille, LABORATOIRE DE MÉCANIQUE DE LILLE TEAM — Stereoscopic PIV is now a relevant method to measure turbulent flow. This method allows the measurement of the three components of the velocity in a plane with an accuracy of about 1-2%. For turbulent flows usually only the large scale motions are investigated due to the limited spatial resolution of the PIV. The main difficulty comes when the derivative has to be computed due to the noise (Foucaut, 2002). The present communication proposes a method to determine the derivative moments which combines both the derivative and the statistic computation from a specific SPIV experiment. Balint et al (1991) published experimental results of derivative moments obtained by HWA in a turbulent boundary layer. A special multiwire probe was designed for this measurement. These results are globally of the same order as the DNS (Antonia et al. 1991), except for the derivative of the streamwise component for which Taylor's hypothesis was used. This was not necessary with stereoscopic PIV. The experiment was performed in the LML 20 m boundary layer facility to determine all the derivative moments needed to determine the dissipation. The Reynolds number was $\mathrm{Re}_\theta = 7500$. Measurements were taken in two normal planes in order to compute all the derivatives of the three components. For the PIV there is a trade-off between field of view and the interrogation window sizes, so the derivative filter choice and the measurement noise management are particularly discussed.

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