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**Results of experimental investigation of the dissipation rate in the near wall region** WILLIAM GEORGE, Princeton University, JEAN-MARC FOUCAUT, Ecole Centrale de Lille, CHRISTOPHE CUVIER, University of Lille, MICHEL STANISLAS, Ecole Centrale de Lille, LABORATOIRE DE MÉCANIQUE DE LILLE TEAM, PRINCETON UNIVERSITY COLLABORATION — The present idea is to propose a method to determine the dissipation rate from a specific SPIV experiment: $\varepsilon = \nu \left[ \left\langle \frac{\partial u_i}{\partial x_j} \frac{\partial u_i}{\partial x_j} \right\rangle + \left\langle \frac{\partial u_i}{\partial x_j} \frac{\partial u_j}{\partial x_i} \right\rangle \right]$ is strongly linked to the small scales of a turbulent flow. It is indispensable for turbulence modelling. Yet it has seldom been measured. To obtain the full dissipation it is necessary to measure the full instantaneous gradient tensor and to compute the 15 moments. But, all are difficult to measure accurately. George and Hussain (1991) proposed to simplify this computation by using different hypotheses in order to reduce the number of terms. Their hypotheses were local homogeneity and local axisymmetry, both of which are more general than the usual assumptions of local isotropy. An experiment was performed in the LML boundary layer facility to determine all the necessary derivative moments. A detailed analysis of the errors in derivative measurements was carried out (see Foucaut et al. 2014 APS), as well as applying and using consistency checks derived from the continuity equation and local homogeneity. Local homogeneity estimates of the dissipation are accurate everywhere to within a few percent. Both local axisymmetry and local isotropy work almost as well outside of y+ = 100, but only local axisymmetry provides a reasonable estimate closer to the wall. The results are remarkably similar to those of Antonia et al (1991) from DNS results of a channel flow at low Reynolds number.

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