

Estimating of higher order velocity moments and their derivatives in boundary layer by Smoke Image Velocimetry

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Abstract

© Published under licence by IOP Publishing Ltd. The results of an experimental evaluation of the third-order moments profiles of velocity fluctuations and their partial derivatives in a zero pressure-gradient turbulent boundary layer are presented. Profiles of characteristics are estimated on the basis of the dynamics of two-component instantaneous velocity vector fields measured by the optical method Smoke Image Velocimetry (SIV). Comparison SIV-measurements with the results of measurements by a thermoanemometer and DNS data with similar Re_θ and Re_τ showed good agreement between the profiles of $\langle u'^2 v' \rangle + \partial \langle u' v'^2 \rangle / \partial y$ and $\langle u' v'^2 \rangle + \partial \langle u' v'^2 \rangle / \partial y$ obtained by SIV and DNS.

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