

Abstract Submitted
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Experimental study for turbulent pipe flow at high Reynolds number using LDV - Turbulent intensity profile and influence of measurement volume NORIYUKI FURUICHI, National Institute of Advanced Industrial Science and Technology, EISUKE KUSANO, Nagoya Univ., YUKI WADA, Japan Atomic Energy Agency, YOSHIYUKI TSUJI, Nagoya Univ. — We have done new experiments for turbulent pipe flow at high Reynolds number, up to $Re_{\tau}=300,000$ using Hi-Reff. In the experiments, the friction factor was measured by the pressure drop along the pipe and the velocity was measured using LDV. In this paper, authors make a focus on the turbulent intensity profile in the pipe flow at high Reynolds number. As one of issues of the measurement, the spatial resolution of the measurement is very sensitive for the turbulent intensity for any measurement methods. With increasing Reynolds number, the relative measurement volume of LDV increases. This issue has been discussed for the hot-wire measurement, however still not done for the LDV. In this paper, the influence of the measurement volume of LDV at the wall bounded flow is studied as first. The measurement volume of LDV is controlled by the changing the insertion angle of the laser. Based on the relation between the normalized spatial resolution L^+ and Reynolds number, the criteria for the measurement at high Reynolds number is clarified. Secondary, the trend with Reynolds number of turbulent intensity profile for streamwise and wall-normal component are reported. Those data are compared with DNS data.

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