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**Dependence of local void fraction distribution on turbulent structure of upward bubbly flow in vertical channel** TOSHIYUKI OGASAWARA, SHU TAKAGI, YOICHIRO MATSUMOTO, Department of Mechanical Engineering, The University of Tokyo — Turbulent structure of upward dilute bubbly flow with 1 mm bubbles in a vertical channel is investigated experimentally. Small amount of surfactant is added to water to avoid bubble coalescence and to control local void fraction distribution. Liquid phase velocity is measured using two-dimensional Laser Doppler Velocimetry. In 1-Pentanol solution of 20 ppm, bubbles have half-slip surface and migrate strongly toward the channel wall due to the shear-induced lift force which leads to wall-peaked distribution of local void fraction. On the other hand, in Triton X-100 solution of 2 ppm, bubbles become fully-contaminated and do not migrate toward the wall or the channel centre due to near-zero lift force, causing uniform distribution of local void fraction in the wall-normal direction. Once bubbles accumulate near the wall, transport of turbulent energy produced by the wall shear towards the channel centre is blocked. Then turbulence induced by the bubble motion becomes dominant in a wide core region (so-called pseudo turbulence). By contrast, in the case of uniform distribution of bubbles, a mechanism of a turbulent energy transport which is the same as that of a single-phase turbulence still exists and furthermore the bubble-induced turbulence is added on it.

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