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Influence of bubble clusters over the turbulent structure in upward bubbly channel flows YOSHITO SEKIGUCHI, WENHAO ZHANG, HIROAKI NAKANISHI, The University of Tokyo, JUN SAKAKIBARA, Meiji University, SHU TAKAGI, The University of Tokyo — We conducted the PIV measurement of upward, turbulent bubbly channel flows. In our experiment, bubbles do not coalesce and become mono-dispersed 1 mm spherical shape due to surfactants in the liquid phase. Adding the surfactant in some specific conditions, these bubbles are attracted toward the wall by the shear induced lift force and form bubble clusters. While they flow near wall, the Reynolds stress of the liquid phase near wall comes close to zero [Takagi, S. and Matsumoto, Y., *Annu. Rev. Fluid Mech.* (2011)]. This suggests that the turbulent structure change dramatically due to bubble clusters. For the further investigation of the turbulent structure, we constructed the measurement system of Scanning Stereoscopic PIV (SSPIV) which can visualize the three-dimensional velocity field. Using this system, we acquire the velocity field and extracted the large scale vortices which dominate the turbulent structure. Also, we constructed another measurement system for tracking the bubble cluster's flow. Through the simultaneous measurement of vortices and bubble cluster, we analyze the influence of bubble cluster over the turbulent structure. The results will be discussed in the presentation.

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