

Abstract Submitted
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Experimental investigation of the motion of bubble clusters and the flow structures with the clusters MASANOBU DATE, KAZUKI MAEDA, The University of Tokyo, TOSHIYUKI OGASAWARA, Osaka Prefecture University, SHU TAKAGI, YOICHIRO MATSUMOTO, The University of Tokyo — In upward bubbly flows, mono-dispersed 1 mm spherical bubbles which do not coalesce in the presence of small amount of surfactants in a liquid phase migrate toward the walls due to the shear-induced lift force. Those bubbles form the bubble clusters near the walls [Takagi, S. and Matsumoto, Y., *Annu. Rev. Fluid Mech.* (2011)]. In this study flow structures of the bubbly flow with the bubble clusters and the motion of the bubble clusters are investigated using scanning stereoscopic Particle Image Velocimetry (PIV) and Particle Tracking Velocimetry (PTV), respectively. In order to focus on bubble clusters, 1 mm bubbles are injected near the one of the walls and bubble clusters are formed under some conditions of gas flow rate. From the measurement of the bubbly flows by stereoscopic PIV, it is shown that the bubbles near the wall accelerate surrounding liquids due to their buoyancy and reduce Reynolds stress with increasing a void fraction. Three-dimensional velocity fields are also measured by scanning stereoscopic PIV, and the effect of the bubble cluster on the instantaneous flow fields are analyzed. The results are discussed in the presentation.

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