Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Experimental study on gas-liquid bubbly turbulent flow in a large square duct[1] HAOMIN SUN, TOMOAKI KUNUGI, Department of Nuclear Engineering, Kyoto University, HIDEO NAKAMURA, Nuclear Safety Research Center, JAEA — Gas-liquid bubbly turbulent flow exists in many industrial areas. Therefore, many experiments for gas-liquid bubbly turbulent flow have been carried out in circular pipes for bubbly turbulent flow model. However, the cross-section of many flow passages are not the circular shape. Since the secondary flow of 2nd kind for single phase turbulent flow in a non-circular duct is well-known, the interaction between the secondary flow of 2nd kind and bubbles in gas-liquid bubbly turbulent flow in the non-circular duct could play an important role. In this study, in order to validate gas-liquid bubbly turbulent flow model in the non-circular duct, measurements were performed in a large square (136mm x 136mm) duct with duct length of 2.8m. The distributions of primary velocity, void fraction and turbulent Reynolds stresses were measured by a hot film probe. It is well-known that the primary velocity distribution of the bubbly flow in a circular pipe has a peak in the pipe center. In contrast, it was found that the primary velocity peaked near the corner of the square duct. In addition, primary velocity distribution changes under various flow conditions were discussed by measuring data of the void fraction and turbulent Reynolds stresses.

[1]Financially Supported by JSPS and G-COE Program(J-051)

HaoMin Sun
Department of Nuclear Engineering, Kyoto University

Date submitted: 03 Aug 2012 Electronic form version 1.4