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Accurate detection of pierced position/angle in bubble measurements by a Single-Tip Optical fiber Probe YUKI MIZUSHIMA[1], Department of Engineering, Shizuoka University, TAKAYUKI SAITO[2], Graduate School of Sci. and Tech., Shizuoka University — An optical fiber probe (OFP) is very useful and reliable to measure bubble diameters, velocities, and local void fractions simultaneously in bubbly flow systems. One of the authors already developed the Single-Tip Optical-fiber Probe (S-TOP), which is practically employed in small-size-bubble measurement in industrial plants. Its sensing tip is smoothly ground into a wedge shape. In optical fiber probing, errors due to S-TOP tip randomly touching the bubble surface were unavoidable thus far. To overcome this problem, we newly propose a pre-signal method, which is powerful yet simple process. It occurs intensively, only when the well-tuned wedge shape tip touches vertically the center region of the bubble. In this study, at first, we quantify the relationship between the intensity of the pre-signal and the contact position/angle. Second, we discuss the outbreak mechanism of the pre-signal. Third, based on the relationship, a pre-signal method is established. Finally, it is confirmed that the pre-signal method is effective in bubbly flow measurement.

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