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Bubble dynamics and bubble-induced turbulence of a single-bubble chain[1] JOOHYOUNG LEE, HYUNGMIN PARK, Seoul National University — In the present study, the bubble dynamics and liquid-phase turbulence induced by a chain of bubbles injected from a single nozzle have been experimentally investigated. Using a high-speed two-phase particle image velociemtry, measurements on the bubbles and liquid-phase velocity field are conducted in a transparent tank filled with water, while varying the bubble release frequency from 0.1 to 35 Hz. The tested bubble size ranges between 2.0-3.2 mm, and the corresponding bubble Reynolds number is 590-1100, indicating that it belongs to the regime of path instability. As the release frequency increases, it is found that the global shape of bubble dispersion can be classified into two regimes: from asymmetric (regular) to axisymmetric (irregular). In particular, at higher frequency, the wake vortices of leading bubbles cause an irregular behaviour of the following bubble. For the liquid phase, it is found that a specific trend on the bubble-induced turbulence appears in a strong relation to the above bubble dynamics. Considering this, we try to provide a theoretical model to estimate the liquid-phase turbulence induced by a chain of bubbles.

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