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Hydrodynamic interaction of a pair of bubbles rising in a quiescent liquid. TOSHIYUKI SANADA, MASAO WATANABE, Kyushu University — Interaction effects on the motions of a pair of bubbles, which either rose in vertical line or side by side, in silicon oil pool were experimentally studied. A pair of bubbles rising in vertical line was generated by releasing bubbles successively from a single nozzle, while one rising side by side was generated, by releasing bubble simultaneously from a pair of horizontally placed orifices. Bubble diameter and liquid kinematic viscosity were taken as the experimental parameters. The motions of bubbles were recorded by a high-speed camera with 2000 fps. We observed that Reynolds number significantly affected the motions of a pair of bubbles rising both in vertical line and side by side. When a pair of bubbles rose in vertical line, the trailing bubble was attracted by the leading bubble wake, and then it collided with leading bubble, in the case of low Re, while a pair of bubbles kept a mutual equilibrium distance due to the balance between the leading bubble wake attractive force and potential repulsive force, in the case of intermediate Re. As Re further increased, the trailing bubble oscillated and then escaped from the vertical line. When a pair of bubbles rose side by side, they separated from each other as they rose in the case of low Re, while they attracted each other and then collided if the initial bubble horizontal distance was smaller than a critical value, in the case of large Re.

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