

Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Translational motion and shape deformation of a pair of bubbles in an acoustic field MINORI SHIROTA, TOSHIYUKI SANADA, MASAO WATANABE, Kyushu University, MASAHARU KAMEDA, Tokyo University of Agriculture and Technology — Translational motions of bubbles with volume and shape oscillations were studied using high-speed photography. The volume oscillations of bubbles, which cause hydrodynamic interactions between two bubbles, were captured in detail. Bubbles of around resonant sizes were forced to oscillate in acoustic fields having frequency of 18.0 and 34.5 kHz, and amplitude ranging from 20 to 100 kPa. The recording rate of 125,000, 250,000 and 1000,000 frames per second were used in high-speed photography. Experimental results for the translation are compared to the previous theoretical model derived by Takahira (1992). This model takes into account the diffusion of vorticity from bubble surface, and is valid even for the translation of intermediate Reynolds number. The validity of the model is verified experimentally for bubbles having Reynolds number of the order of 10. The effect of shape deformations on the translation was also examined.

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Date submitted: 01 Aug 2006

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