Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Ultrasound-induced oscillations of gas bubbles in contact with gelatin gel surfaces[1] SOSUKE FUKUI, KEITA ANDO, Keio Univ — Ultrasound-induced dynamics of gas bubbles in the vicinity of deformable boundaries are studied experimentally, as a simplified model of sonoporation in medicine. In our experiment, 28-kHz underwater ultrasound was irradiated to a gas bubble nuclei (of radius from 60 μm to 200 μm) sitting at gel surfaces (of gelatin concentration from 6 wt% to 16 wt%) and the bubble dynamics were recorded by a high-speed camera. The repeated deformation of the gel surface was found to be in phase with volumetric oscillation of the bubble. A liquid jet, which can appear toward the collapse phase in the bubble oscillation in volume, produced localized surface deformation, which is an important observation in the context of sonoporation. We characterize the maximum displacement of the gel surface with varying the bubble nuclei radius (in comparison to the resonant radius fixed approximately at 117 μm). We also examine the phase difference between the ultrasound and the bubble dynamics under the influence of the deformable boundary.

[1]the Research Grant of Keio Leading-edge Laboratory of Science & Technology

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Date submitted: 01 Aug 2017 Electronic form version 1.4