

Supplementary material for

Surface modes with controlled axisymmetry triggered by bubble coalescence in a high-amplitude acoustic field

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This document contains the captions for the videos (Video1 to Video4) that are part of the supplementary material.

GENERAL INFORMATION

The videos Video1 to Video4 are those that have been used to extract the temporal bubble dynamics after bubble coalescence in the main document (figures 5 to 8). For reasons of document size we limit the videos to 50 images before and 300 images after coalescence and furthermore compress to jpeg format. With a frame rate of 67.065 kHz, this corresponds to the time interval -0.746 ms to 4.473 ms where $t = 0$ ms corresponds to the first image after film rupture. The created avi-documents are played with a frame rate of 6 frames per second. The driving frequency of all bubbles is 31.25 kHz.

Video1: Bubble oscillating only radially in the steady-state regime

This case is presented in figure 3a (some snapshots) and figure 5 (extracted temporal bubble dynamics) in the main document. The parameters are as follows:

Size of the first bubble: $R_{0,1} = 25.3 \mu\text{m}$
 Size of the second bubble: $R_{0,2} = 30.3 \mu\text{m}$
 Size of the coalesced bubble: $R_{0,\text{coal}} = 39.5 \mu\text{m}$
 Acoustic pressure: $p_{\text{ac}} = 14.8$ kPa
 Pressure threshold: the pressure is beneath all thresholds
 Pixel size: $3.52 \mu\text{m}$
 Frame size: 256×256 pixel (0.901 mm \times 0.901 mm)

Video2: Mode 2 dominant in the steady-state regime

This case is presented in figure 3b (some snapshots) and figure 6 (extracted temporal bubble dynamics) in the main document. The parameters are as follows:

Size of the first bubble: $R_{0,1} = 40.3 \mu\text{m}$
 Size of the second bubble: $R_{0,2} = 19.8 \mu\text{m}$
 Size of the coalesced bubble: $R_{0,\text{coal}} = 44.9 \mu\text{m}$
 Acoustic pressure: $p_{\text{ac}} = 30.6$ kPa
 Pressure threshold for mode 2: $p_{\text{th}}^n = 16.4$ kPa
 Pixel size: $7.45 \mu\text{m}$
 Frame size: 256×256 pixel (1.907 mm \times 1.907 mm)

Video3: Mode 3 dominant in the steady-state regime

This case is presented in figure 3c (some snapshots) and figure 7 (extracted temporal bubble dynamics) in the main document. The parameters are as follows:

Size of the first bubble: $R_{0,1} = 62.9 \mu\text{m}$
 Size of the second bubble: $R_{0,2} = 26.2 \mu\text{m}$
 Size of the coalesced bubble: $R_{0,\text{coal}} = 68.1 \mu\text{m}$
 Acoustic pressure: $p_{\text{ac}} = 10.4$ kPa
 Pressure threshold for mode 3: $p_{\text{th}}^n = 6.6$ kPa
 Pixel size: $3.52 \mu\text{m}$
 Frame size: 256×256 pixel (0.901 mm \times 0.901 mm)

Video4: Mode 4 dominant in the steady-state regime

This case is presented in figure 3d (some snapshots) and figure 8 (extracted temporal bubble dynamics) in the main document. The parameters are as follows:

Size of the first bubble: $R_{0,1} = 49.2 \mu\text{m}$

Size of the second bubble: $R_{0,2} = 32.6 \mu\text{m}$

Size of the coalesced bubble: $R_{0,\text{coal}} = 53.6 \mu\text{m}$

Acoustic pressure: $p_{\text{ac}} = 24.1 \text{ kPa}$

Pressure threshold for mode 2: $p_{\text{th}}^n = 6.5 \text{ kPa}$

Pixel size: $7.45 \mu\text{m}$

Frame size: $256 \times 256 \text{ pixel}$ ($1.907 \text{ mm} \times 1.907 \text{ mm}$)