Appendix to "Interaction between two laser-induced cavitation bubbles in a quasi-two-dimensional geometry. Supplementary material"

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Figure 1 shows experimental radius-time data for three different bubbles created in the same 2 dimensional liquid gap. The size of the bubble is varied by adjusting the laser energy, increasing from circles to squares and to triangles. To guide the eye the data points are joined by dotted lines. The diamonds depict the next frame on the recording showing a "vanished" bubble, i.e. at this time the vapour bubble has collapsed and recondensed back into the liquid. Thus, the collapse occurred just before the time of the picture taken.

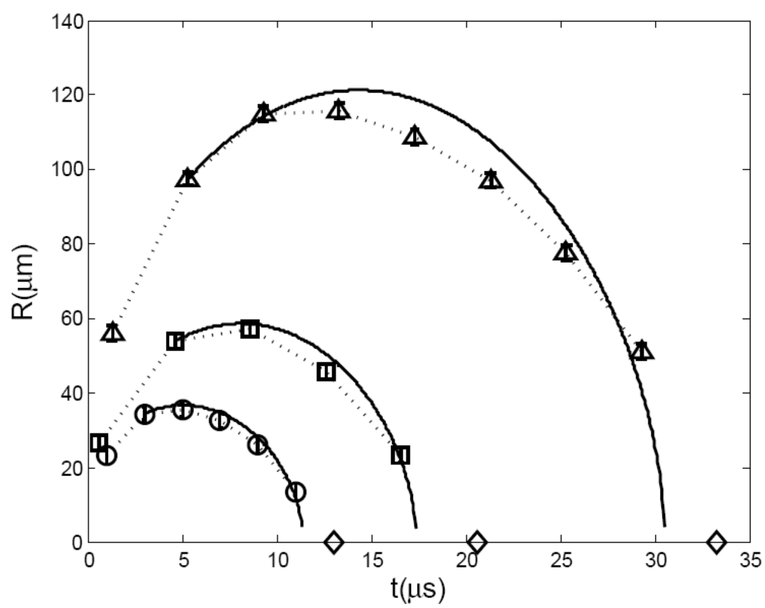

Figure 1: Bubble dynamics for different sizes/lifetimes in the same narrow gap of 15 μm height. With increasing lifetime the discrepancies between the experimental data (open symbols) and the model (solid lines) become evident. The dashed curve aides the eye and connects the data point.

The solid lines are fits to the 2d potential flow model in a least square sense; there all data points with a finite radius except the first one are considered using the same parameters and procedure as presented in the main text. From Fig. 1 we find that bubbles with sufficiently short life-time can be nicely fitted to the potential flow model. Larger bubbles with a longer life-time show an increasing discrepancy to the model. In particular the maximum bubble radius is overestimated by the model and the collapse proceeds slower in the experiment. Here, as in our previous work, Zwaan *et al.* 2006, shows a slowing down of the collapse with increasing bubble size. This observation is consistent with the prediction of growing boundary layers. We estimated that bubbles lasting for more than $19\,\mu$s will experience a developed flow rather than a plug flow. This rough estimate is consistent with Fig. 1. The largest bubble collapsing around $30\,\mu$m shows a viscosity hindered collapse, whereas the bubble collapsing at $17\,\mu$s is less affected.

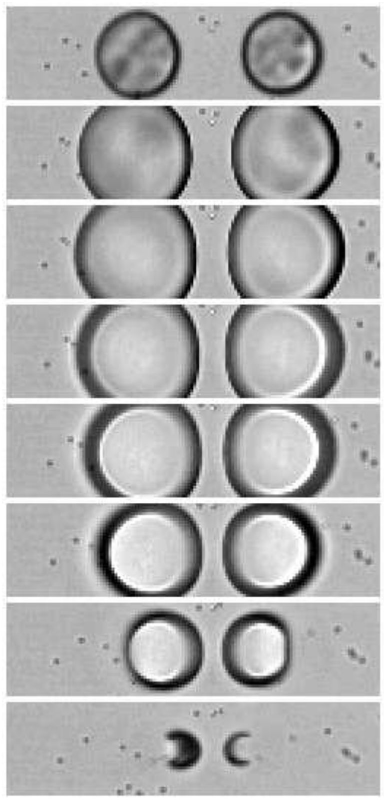

Figure 2: Jetting of two equally sized bubbles captured with a framing speed of 450,000 fps. The frame is 256 μm wide.

Jetting

Figure 2 depicts a jetting event. The first frame has been recorded 950ns after the arrival of the laser pulse and the time interval between frames is 2.2 μs. Because jetting only occurs in the very last moment of collapse which is much less time than the inter frame time of 2.2 μs. Thus, it is a rather rare event to depict the jets with the moderate framing rates used in this study. We prevented motion blurring due to short exposure time of 300ns.