Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

The most spherical cavitation bubble[1] MARC TINGUELY, DANAIL OBRESCHKOW, PHILIPPE KOBEL, NICOLAS DORSAZ, AURELE DE BOSSET, MOHAMED FARHAT, Ecole Polytechnique Federale de Lausanne — Focusing a high energy pulsed laser into water is a widely used method to generate a single cavitation bubble. Such a bubble is generally assumed to collapse spherically. However, the precision of the focusing system and the effect of gravity, most often neglected, break the spherical symmetry of the collapse. In the experiment presented here, we generated the "most spherical" cavitation bubbles in a series of experiments by (1) running the experiments in microgravity (during the 52nd ESA Parabolic Flight Campaign), and (2) using an optimized laser focusing system. The collapse and the rebound of the bubbles were then investigated to experimentally determine the fraction of potential energy of the bubble transformed into the rebound bubble and into the shock wave at the collapse. We found that the transfer of the energy into both channels can be well predicted using a single non-dimensional parameter. A theoretical model is developed and shows good agreement with the experimental results.

[1]SNSF Grant 200020-116641

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Date submitted: 12 Aug 2011 Electronic form version 1.4