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LASER-GENERATED CAVITATION BUBBLES IN A FLUID LAYER OF FINITE DEPTH

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Abstract. Laser-generated cavitation bubbles in a thin liquid layer lead to the formation of fast liquid jets at both the free surface to the liquid layer and as an opposing jet within the collapsing bubble. This paper studies this phenomenom from both an analytical perspecitive, using the Kelvin impulse, and through computational techniques based on the boundary integral method. Output includes bubble and jet shapes and the percentage of the impulse and energy in the jet of the collapsing bubble. Calculations indicate that in excess of 30% of the liquid energy and 60% of the impulse can be found in the jet in the examples considered in this paper.

Keywords. Cavitation bubble, laser-generated, shallow-layer, liquid jets, Kelvin impulse.

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