

Abstract Submitted
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Large bubble entrainment in drop impact MARIE-JEAN THORAVAL¹, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia , YANGFAN LI, National University of Singapore, 9 Engineering Drive 1, Singapore 117576, SIGURDUR T. THORODDSEN, King Abdullah University of Science and Technology (KAUST), Thuwal, 23955-6900, Saudi Arabia — A drop impacting on a pool of the same liquid can entrap air bubbles in many different ways. A peculiar entrainment was observed by Pumphrey and Elmore (1990) and remained unexplained until now. For a small range of parameters, the cavity produced by the impacting drop spreads radially in a dish-shape and then closes to entrap a bubble larger than the drop. We demonstrate that the large bubble is caused by a vortex ring produced in the liquid during the impact of the drop. We combine experiments and numerical simulations to show that the vortex ring pulls on the interface on the side of the cavity to stretch it radially, explaining the shape of the cavity. Only prolate drops are able to generate large bubbles. This is due to the self-destruction of the vortex earlier during the impact for flatter drops.

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