

Abstract Submitted
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The living times of bubbles at the interface¹ BENJAMIN CAMERON, LYDIA BOUROUIBA, Massachusetts Institute of Technology, NICOLAS VANDENBERGHE, EMMANUEL VILLERMAUX, IRPHE, Aix-Marseille Université — The lifetime of a water bubble at the surface of a pool prior to its burst remains an open question. It is known that the death of a bubble is initiated by the nucleation of a hole in its shell. However, the mechanisms governing the occurrence of such nucleation sites and prescribing the lifetime of bubbles remain unclear. Combining original visualizations, quantitative measurements of bubbles lifetimes and simple theoretical ideas, we report direct observations of the onset of the bursting process and rationalize the link between the rich interfacial events leading to the hole nucleation on the shell and the resulting robust bubble lifetimes distributions. These play a critical role in shaping the final size distribution of the droplets emitted. We will underline the consequences of the process in the sensible world, like air-sea water vapor exchanges. Bubbles bursting at the surface of water sources also allow for high levels of contamination and long-term exposure to a range of respiratory human pathogens and irritants indoors. Indeed, the droplets created by such bursts can contribute to the transfer of pathogens to the air, followed by their dispersal, thus bridging this subtle problem with unexpected new areas in health.

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