Life and death of surface bubbles

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ABSTRACT

Surface bubbles are of crucial interest since they favours the transport of material from the bulk to the overlying atmosphere through the production of aerosols. This can be applied for example in climate models, air pollution studies or in the carbonated beverage industry since the produced aerosols contain most of the flavour. This work focuses on the stability of surface bubbles [1]. The evolution of such a bubble after reaching the interface can be decomposed in two phases: the thinning of the film through drainage and evaporation and the bursting after the initiation of a hole. In this presentation, we will explore these different stages. An automatic stability measurement under controlled atmospheric humidity allows to collect a large quantity of data and we demonstrate that the bubble lifetime is fixed by the thinning through drainage and evaporation [2] provided convective evaporation [3] is taken into account. We will show that the description of drainage necessitates to take into account the impact of marginal regeneration (rising patches, which can be seen in Fig. 1). Finally, we will infer some insights about bubble bursting concerning the position of the bursting initiation and the film thickness.

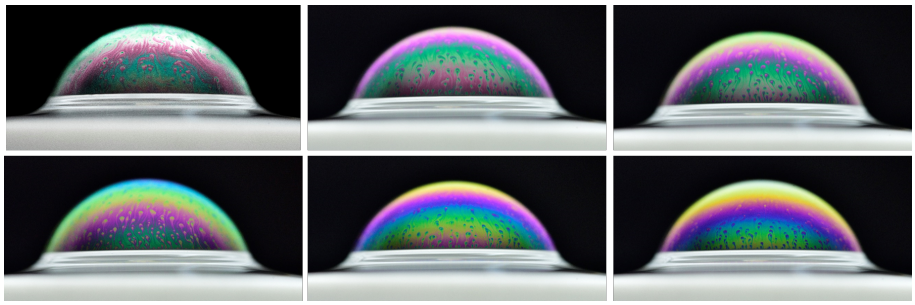

Figure 1: *Photographs of a surface bubble thinning along time. ©Serge Guichard.*

[1] J. Miguet, M. Pasquet, F. Rouyer, Y. Fang, E. RiO, Soft Matter, 2020

[2] S. Poulain, L. Bourouiba, Phys. Rev. Lett. 2018.

[3] B. Dollet, F. Boulogne, Phys. Rev. F, 2017