Abstract Submitted
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Bursting of a bubble confined in between two plates[1] MAYUKO MURANO, NATSUKI KIMOTO, KO OKUMURA, Ochanomizu University — Rupture of liquid thin films, driven by surface tension, has been studied for more than a century [1,2]. As for a three-dimensional film, it is reported theoretically and numerically that the film edge, regardless of its viscosity, eventually attains the Taylor-Culick velocity predicted on the basis of inviscid theory [3]. Here, we studied the bursting of films in confined geometries. The confined film bursts at a speed three to five orders of magnitude slower, which means that the bursting dynamics is completely different from that of three dimensional films. We quantify the shape of rims and velocity field inside the film via strongly magnified high-speed images of bursting tips, and provide physical insights on the bursting dynamics by using a simple model. Under a certain condition, the confined film bursts like a three-dimensional film. We will also discuss the transition of the bursting dynamics from three-dimensional to confined one. [1] L. Rayleigh, Nature 44 (1891) [2] F. E. Culick, J. Appl. Phys. 31 (1960) [3] N. Savva and J. W. M. Bush, J. Fluid Mech. 626 (2009)

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