

Abstract Submitted
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Cavitation propagation in water under tension¹ XAVIER NOBLIN, YANN YIP CHEUNG SANG, MATHIEU PELLEGRIN, LPMC, CNRS UMR 7336, Universite de Nice Sophia-Antipolis, Parc Valrose, 06108 Nice Cedex 2,, MATERIALS AND COMPLEX FLUIDS TEAM — Cavitation appears when pressure decreases below vapor pressure, generating vapor bubbles. It can be obtained in dynamical ways (acoustic, hydraulic) but also in quasi-static conditions. This latter case is often observed in nature, in trees, or during the ejection of fern spores [1]. We study the cavitation bubbles nucleation dynamics and its propagation in a confined microfabricated media. This latter is an ordered array of microcavities made in hydrogel filled with water [2]. When the system is put into dry air, it dehydrates, water leaves the cavities and tension (negative pressure) builds in the cavities. This can be sustained up to a critical pressure (of order -20 MPa), then cavitation bubbles appear. We follow the dynamics using ultra high speed imaging. Events with several bubbles cavitating in a few microseconds could be observed along neighboring cells, showing a propagation phenomenon that we discuss.

[1] X. Noblin, N. O. Rojas, J. Westbrook, C. Llorens, M. Argentina, J. Dumais. The Fern Sporangium: A Unique Catapult. *Science*, 335, 1322, 2012.

[2] Tobias D. Wheeler and Abraham D. Stroock. The transpiration of water at negative pressures in a synthetic tree. *Nature*, 455, 208-212, 2008.

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