

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Wrinkles in reinforced membranes ATSUSHI TAKEI, ESPCI, FABIAN BRAU, Université de Mons, BENOÎT ROMAN, JOSÉ BICO, ESPCI — We study, through model experiments, the buckling under tension of an elastic membrane reinforced with a more rigid strip or a fiber. In these systems, the compression of the rigid layer is induced through Poisson contraction as the membrane is stretched perpendicularly to the strip. Although strips always lead to out-of-plane wrinkles, we observe a transition from out-of-plane to in plane wrinkles beyond a critical strain in the case of fibers embedded into the elastic membranes. The same transition is also found when the membrane is reinforced with a wall of the same material depending on the aspect ratio of the wall. We describe through scaling laws the evolution of the morphology of the wrinkles and the different transitions as a function of material properties and stretching strain.

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Date submitted: 11 Nov 2011

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