

Abstract Submitted
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Capillary Origami Controlled by Electrowetting MIGUEL

PINEIRUA, JOSE BICO, BENOIT ROMAN, PMMH — What happens if a water droplet is deposited over an elastic sheet? The sheet spontaneously wraps around droplet? This is possible if the capillary forces due to the liquid/air interface overcome the bending stiffness of the elastic sheet [1]. This technique called “capillary origami” could be used not only to encapsulate micro droplets but also to produce 3-D objects out from planar patterns. Once the microstructure has closed, could it be possible to reopen it at will? The wetting properties of liquids can be modified by the action of an electric field [2]. This phenomenon known as electrowetting can be seen as the electric energy minimization of a capacitor. In order to be capable of reopening the capillary origami, we propose to apply an electric field between the droplet and the substrate, with the flexible sheet as an isolating layer between them. The sheet will stay wrapping the droplet while the circuit is open and will eventually unwrap it if a sufficiently intense electric field is applied. We attempt to describe the original interaction between the electric field, capillarity and elasticity.

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[2] F. Mugele, J.-C. Baret, Electrowetting : from basics to applications, *J. Phys. Cond. Mat.*, 17, R705 (2005).

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