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Droplets act as compass needles for the tension in a membrane RAFAEL SCHULMAN, Department of Physics and Astronomy, McMaster University, Hamilton, Ontario, Canada, L8S 4M1, RENE LEDESMA-ALONSO, Catedra CONACYT, Universidad de Quintana Roo, Boulevar Bahia s/n, Chetumal, 77019 Quintana Roo, Mexico, THOMAS SALEZ, ELIE RAPHAEL, Laboratoire de Physico-Chimie Theorique, UMR CNRS Gulliver 7083, ESPCI Paris, PSL Research University, 75005 Paris, France, KARI DALNOKI-VERESS, Department of Physics and Astronomy, McMaster University, Hamilton, Ontario, Canada, L8S 4M1
— We present experiments which study droplets atop thin elastomeric films with anisotropic tension. Surprisingly, we find that the droplets are not spherical caps and become elongated along the axis of highest tension. As such, liquid droplets create a map for the principal stress directions in a film. In our experiments, we completely determine the contact line geometry using a combination of contact angle measurements and optical profilometry. In addition, we measure an out-of-plane deformation of the film surrounding the droplet. Simple theoretical arguments successfully capture the experimental findings.

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