

Abstract Submitted
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Dynamics of surfactants spreading on gel layers¹ CONSTANTINE SPANDAGOS, PAUL LUCKHAM, OMAR MATAR, Imperial College London — Gel-like materials are of central importance to a large number of engineering, biological, biomedical and day-life applications. This work attempts to investigate the spreading of droplets of surfactant solutions on agar gels, which is accompanied by cracking of the gel layers. The cracking progresses via the formation of patterns that resemble “starbursts,” which have been reported recently in the literature by Daniels et al. Marangoni stresses generated by surface tension gradients between the surfactant droplet and the uncontaminated gel layer are identified to be the driving force behind these phenomena. The morphology and dynamics of the starburst patterns are investigated for droplets of different surfactant solutions, including sodiumdodecylsulphate, spreading on gel layers of different strengths. The instability is characterised in terms of the number of arms that form, and their mean width and length as a function of time. In addition, photoelasticity is used to provide information about the stress field of the material, which, combined with the results from our direct visualisation, can elucidate further the mechanisms underlying the pattern formation and the nature of the interactions between the liquid and the gel.

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