

Abstract Submitted
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Bulk Elastic Fingering in Soft Materials BAUDOUIN SAINTYVES, Harvard University, JOHN BIGGINS, Cambridge University, ZHIYAN WEI, Stanford University, SERGE MORA, Montpellier 2 University, L. MAHADEVAN, Harvard University, ELISABETH BOUCHAUD, ESPCI-PARISTECH, HARVARD UNIVERSITY TEAM, ESPCI-PARISTECH COLLABORATION, CAMBRIDGE UNIVERSITY COLLABORATION, MONTPELLIER 2 UNIVERSITY COLLABORATION — Systematic experiments have been performed in purely elastic polyacrylamide gels in Hele-Shaw cells. We have shown that a bulk fingering instability arises in the highly deformable confined elastomers. A systematic study shows that surface tension is not relevant. This instability is sub-critical, with a clear hysteretic behavior. Our experimental observations have been compared very favorably to theoretical and finite element simulations results. In particular, the instability wavelength and the critical front advance have been shown to be proportional to the distance between the two glass plates constituting the cell. A very important feature is that elasticity doesn't influence this lengthscale, making this instability very generic. We will also show some new results about an elastic counterpart experiment of the famous Saffman-Taylor experiment, where we push a soft gel in a stiff one.

baudouin saintyves
Harvard University

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