

Abstract Submitted  
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**Soft Cell: Flow-induced deformation of a compliant Hele-Shaw cell** FINN BOX, School of Physics, University of Manchester, GUNNAR PENG, DAMTP, University of Cambridge, ANNE JUEL, DRAGA PIHLER-PUZOVIC, School of Physics, University of Manchester — We present an experimental study of the flow-induced deformation of a compliant Hele-Shaw cell, comprising a soft substrate and a rigid upper boundary separated by a thin gap. An axisymmetric displacement flow is formed by injecting viscous fluid, at a constant volumetric flux, into the center of the cell, which is pre-filled with the same fluid. By measuring the surface deflection of the substrate, we find that the deformation profile is self-similar during a period of transient growth before rapidly attaining a steady shape determined by the logarithmic profile of the fluid pressure within the cell. We discuss how the deformed substrate influences the motion of the advancing front between injected and resident fluid in the cell.

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