

Abstract Submitted
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Snakes and labyrinths: contact fingering instability of a soft elastic film between two rigid surfaces. BEN DAVIS-PURCELL, KARI DALNOKI-VERESS, McMaster University — Intricate patterns are abundant in nature, from the stripes of a zebra, to the formation of snowflakes, to the wavy peaks and valleys on a beach. One such instability occurs when a soft elastomeric film bonded to a rigid substrate deforms to adhere to another rigid surface brought into contact with the film. If there is a gap between the film and the surface, then a contact fingering instability results as the film deforms to adhere to the surface. The reduction in the interfacial surface energy upon adhering is balanced by the elastic strain as the soft film deforms to span the gap and leads to distinct labyrinth patterns. We study the formation of this adhesion-induced instability and observe the fingering labyrinth pattern both statically, to measure wavelength as a function of film thickness, as well as dynamically where we see patterns similar to snakes meandering along the ground. We also investigate this contact fingering instability in the presence of an anisotropic tension in the soft elastic film.

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