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Dynamics of viscous adhesion: from elongated capillary bridges to fingering instability MANON L'ESTIME, JOSE BICO, ETIENNE REYSSAT, ESPCI Paris — Two thin viscous layers adhere to one another through the formation of a liquid bridge that grows and expels the air separating the adhesive layers. The bridge feeds on the liquid layers, sometimes leading to a fingering instability. Unexpectedly, the fingers are formed by the liquid whose viscosity is higher than the surrounding air. To explore this instability, we first address the model problem of a single finger of wetting liquid bridging a bath to an overhanging beam. We show that the finger dynamics strongly depends on the liquid viscosity, the depth of the pool, and the gap separating the liquid surface from the beam. We then describe the fingering instability that occurs when putting two coated surfaces in contact, and present how the fingers dynamics is influenced by the gap between the solid surfaces, the amount of liquid available, and the physical properties of the liquid.

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