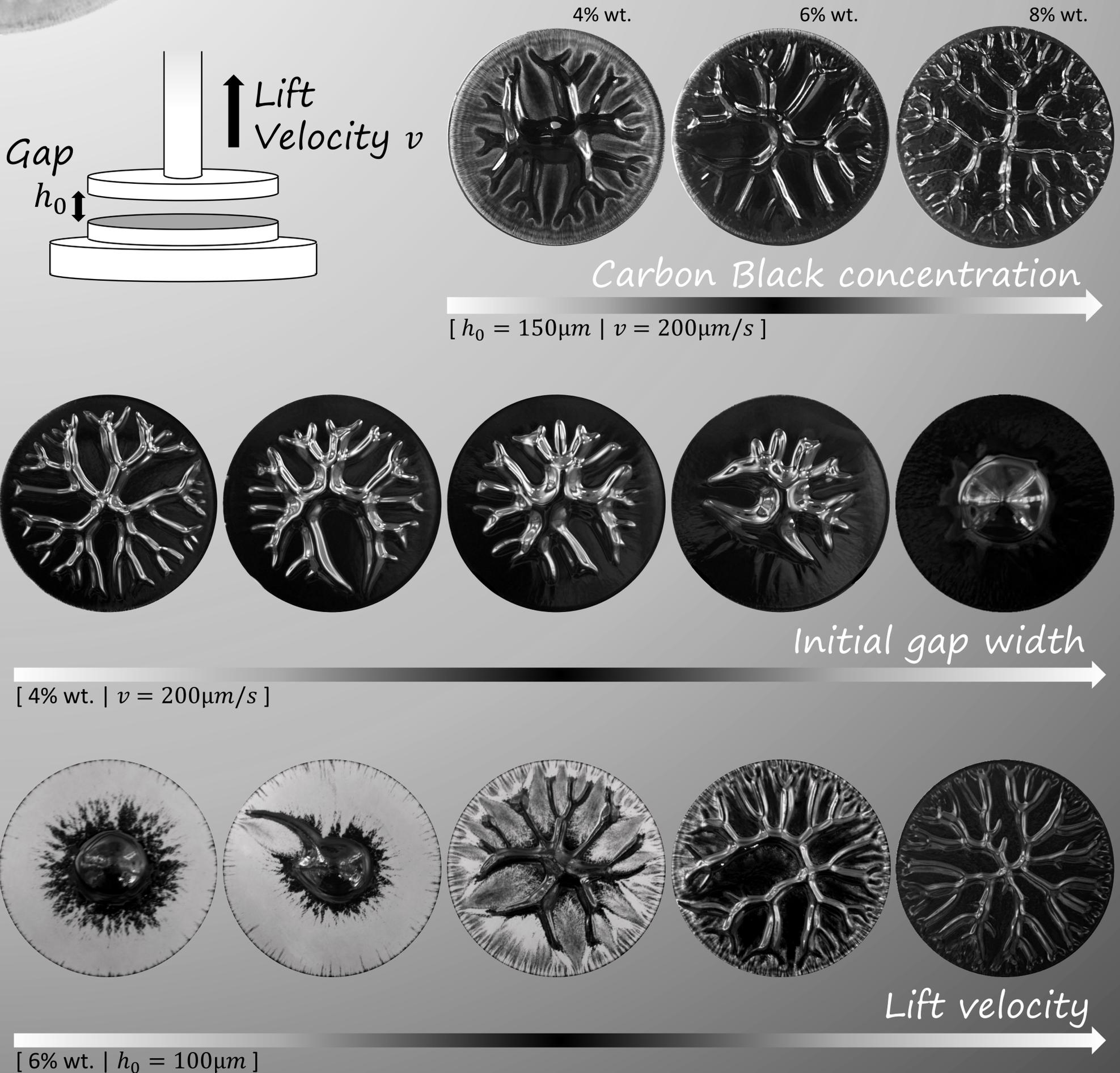


Fingering patterns in colloidal gels

Thibaut Divoux¹, Badis Marsit², Yacouba Kaloga¹ and Irmgard Bischofberger²

¹Joint CNRS-MIT Lab UMI 3466, ²Massachusetts Institute of Technology



A carbon black gel is sandwiched between two parallel plates separated by a gap h_0 . The upper plate is lifted at a constant velocity v . We show the existence of two critical parameters that determine the onset of unstable growth: a minimal lift velocity and a maximal gap width. In the unstable regime, finger-like structures form originating from the classical Saffman-Taylor instability at the gel-air interface. The diameter of the resulting pattern is controlled by the yield strain of the gel. Finally, for small gap width, the finger growth occurs by a stick-slip instability (bottom right image).

