

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Stability and fingering of radial flows JOHN LISTER, FREDERIK DAUCK, University of Cambridge — A pool of honey spreading on a horizontal surface becomes axisymmetric, but radial flow in a Hele-Shaw cell is unstable to fingering if the injected fluid is sufficiently less viscous than the ambient. Why the difference? Radial geometries offer a distinct advantage for the analysis of fingering instabilities of spreading flows in that the azimuthal wavenumber remains constant and thus self-similarity methods can be employed. Several problems of this sort are described. For example, it is shown analytically that viscous gravity currents, with power-law injection and power-law flux relationship $q = -h^n \nabla h$, are stable. And it is shown by analysis of a self-similar kinematic wave that Hele-Shaw flows of miscible fluids at infinite Peclet number are unstable if and only if the viscosity ratio exceeds $3/2$.

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Date submitted: 01 Aug 2019

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