

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Elastic viscous fingering** JOHN LISTER, GUNNAR PENG, University of Cambridge — The Saffman–Taylor viscous-fingering instability in a circular Hele–Shaw cell can be suppressed by replacing one of the rigid walls with an elastic sheet (Pihler-Puzovic, Illien, Heil, Juel, 2012). We successfully reproduce these results numerically by considering linear non-axisymmetric perturbations to an axisymmetric evolving base state. Our calculations show that, in the relevant parameter regime, the non-axisymmetric perturbations to the elastic sheet are negligible. Instead, the elastic suppression of the fingering instability is due to changes to the axisymmetric base state. We identify four physical mechanisms that affect the stability of the system, and find that the contribution from each one is significant.

John Lister  
University of Cambridge

Date submitted: 31 Jul 2014

Electronic form version 1.4