Dynamics of surfactant-laden lenses[1] DAVID BEACHAM, GEORGE
KARAPETSAS, RICHARD CRASTER, OMAR MATAR, Imperial College London
— We consider the dynamics of lenses of immiscible fluids laden with surfactant. We
use lubrication theory to derive equations for the positions of the interfaces and the
surfactant concentrations. The surfactant is allowed to exist in the form of monomers
as well as micelles and the model accounts for the effects of surfactant on the moving
contact line. We use a finite-element formulation to obtain numerical solutions of
the evolution equations and carry out a full parametric study. Our results catalogue
the various types of behaviour encountered, which range from complete spreading
of the lens, to spreading followed by retraction, to sustained oscillations.

Omar Matar
Imperial College London

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