

Abstract Submitted
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The effect of gravity on drainage and rupture in surfactant-free foams¹ MICHAEL DAVIS, Northwestern University, PETER STEWART, Oxford University, STEPHEN DAVIS, Northwestern University — In low liquid-fraction surfactant-free foams, lamella thinning due to drainage leads to rupture by van der Waals instability, which causes coarsening due to coalescence of neighboring bubbles. We use asymptotic analysis to predict the effect of gravity on drainage flow for a flat, vertical lamella and for a weakly bent, horizontal lamella. In both cases the films thin non-uniformly, and the thinning is exponential for long times; much faster than the power law thinning rate predicted for gravity-free lamella drainage. The asymptotic solutions are also able to predict the onset of rupture in both geometries. Numerical solutions are used to verify these asymptotic predictions, and to determine their range of validity for relevant parameters.

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