

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Sorting Category: 23. (T)

Coarsening of dewetting thin films subject to gravity¹

MICHAEL GRATTON, Duke University, THOMAS WITELSKI, Oxford University — Thin films of viscous fluids coating hydrophobic substrates are unstable to dewetting instabilities, and long-time evolution leads to the formation of an array of near-equilibrium droplets connected by ultra-thin fluid layers. In the absence of gravity, previous use of lubrication theory has shown that coarsening dynamics will ensue – the system will evolve by successively eliminating small drops to yield fewer larger drops. While gravity is expected to only have an influence on thicker films, we show that it has a significant influence on the coarsening dynamics of the problem, dramatically slowing the rate of coarsening for large drops. Small drops may be relatively unaffected, but as coarsening progresses, these aggregate into larger drops whose shape and dynamics are different.

¹Supported by the NSF under grants DMS FRG 0244498, CAREER 0239125

- Prefer Oral Session
 Prefer Poster Session

Michael Gratton
mgratton@math.duke.edu
Duke University

Date submitted: 23 Jul 2007

Electronic form version 1.4