

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Ring formation on an inclined surface¹ ROBERT DEEGAN, XIYU DU, University of Michigan — A drop dried on a solid surface will typically leave a narrow band of solute deposited along the contact line. We examined variations of this deposit due to the inclination of the substrate using numerical simulations of a two-dimensional drop, equivalent to a strip-like drop. An asymptotic analysis of the contact line region predicts that the upslope deposit will grow faster at early times, but the growth of this deposit ends sooner because the upper contact line depins first. From our simulations we find that the deposit can be larger at either the upper or lower contact line depending on the initial drop volume and substrate inclination. For larger drops and steeper inclinations, the early lead in deposited mass at the upper contact line is wiped out by the earlier depinning of the upper contact line and subsequent continued growth at the lower contact line. Conversely, for smaller drops and shallower inclinations, the early lead of the upper contact line is insurmountable despite its earlier termination in growth. Our results show that it is difficult to reconstruct *a posteriori* the inclination of the substrate based solely on the shape of the deposit.

¹The authors thank the James S. McDonnell Foundation for support through a 21st Century Science Initiative in Studying Complex Systems Research Award, and the National Science Foundation for support under Grant No. 0932600.

Robert Deegan
University of Michigan

Date submitted: 31 Jul 2015

Electronic form version 1.4