Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Elastocapillary Swelling: When coalesced structures curl apart DOUGLAS HOLMES, Boston University, PIERRE-THOMAS BRUN, MIT, ANUPAM PANDEY, University of Twente, SUZIE PROTIERE, Institut Jean Le Rond d'Alembert — We consider the elastocapillary rise between swellable structures using a favorable solvent. We study the elastocapillary rise and subsequent swelling-induced bending, and characterize the dynamic deformations and resulting equilibrium configurations for various beam geometries. Our analysis highlights the importance of two characteristic length scales, and uses these lengths to predict both the elastocapillary rise and the critical curvature for peeling. We predict the transition between coalescence dominated beams and bending dominated beams using a balance of bending, stretching, and surface energies, and use a relaxed constraint on Euler's elastica to describe the fluid ratcheting.

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Date submitted: 06 Nov 2015 Electronic form version 1.4