Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Influence of yield stress and shear thinning on the capillary ridge formation of gravity-driven Herschel-Bulkley fluid on an incline[1] MD. RAJIB ANWAR, BIN HU, KYLE CAMARDA, SARAH KIEWEG, University of Kansas — In this work on gravity-driven spreading, we discuss the impact of surface tension on the spreading and free surface shape of a finite bolus of a Herschel-Bulkley fluid. We incorporate surface tension into a 2D (i.e. 1D spreading) Herschel-Bulkley thin film flow model. Studies have indicated that incorporating surface tension can result in the emergence of a capillary ridge in thin fluid films and the capillary ridge is strongly related to contact line fingering instability. Our previous numerical study showed that increased shear-thinning (in a fluid without yield stress) suppressed the capillary ridge. A previous linear stability analysis by Balmforth *et al.* (2007) showed that the yield stress in a Bingham fluid dampens the instability. Our numerical results in this study will provide initial insight on the impact of yield strength, shear-thinning index, and inclination angle on the overall spreading and appearance of the capillary ridge in Herschel-Bulkley fluids.

[1]This work is supported by NIH R21/R33 Microbicide Innovation Program IV [R21/R33 AI082697]

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Date submitted: 01 Aug 2013 Electronic form version 1.4