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Effect of Wetting on Pinch-off Dynamics of Viscoelastic Micellar Fluids HADI MOHAMMADIGOUSHKI, SHIJIAN WU, Florida State University, FLORIDA STATE UNIVERSITY TEAM — We conduct experiments by gradually depositing non-Newtonian surfactant fluids onto a horizontal solid substrate via a vertical needle. We investigate the extent to which, the spreading dynamics of the fluid contact-line on the solid substrate can affect the thinning dynamics of the fluid filament formed between the needle and substrate. Experiments are performed using two flat substrates; a big substrate, where fluid contact-line in free to move and a finite size substrate, where fluid contact-line is pinned. Two distinct flow regimes are observed. In regime I, the fluid wetting dynamics does not significantly affect the filament thinning process. However, in regime II, the fluid wetting on the big solid substrate impacts the filament thinning dynamics significantly by lowering the filament life time, extensional relaxation times and the Trouton ratios compared to that of the pinned contact-line. Our analysis shows that spreading of these viscoelastic surfactant fluids are reasonably well captured by Tanner's law suggested for spreading of a Newtonian fluid on solid substrates. We propose a scaling analysis based on a combination of the wetting forces and viscous dissipation that can successfully distinguish these two flow regimes from each other.

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