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**Transient Evolution of Flow Profiles in Shear Banding Wormlike Micellar Fluids** HADI MOHAMMADIGOUSHKI, PETER RASSOLOV, Florida State University, FLORIDA STATE UNIVERSITY TEAM — We report experiments on spatiotemporal evolution of flow field in model shear-banding viscoelastic micellar solutions in a Taylor-Couette cell. Our goal is to systematically study the effects of fluid elasticity on transient evolution of flow fields. By varying surfactant concentration, salt concentration, and temperature, we vary the fluid elasticity in the range 4.21 $10^4$ to 8.57 $10^6$ while keeping entanglement density fixed at 5.1 0.7, viscosity ratio fixed at 40.3 2.9 Pa•s, and curvature fixed at 0.085. Our experiments show as shear strain increases, shear stress shows an overshoot followed by a decay towards steady state. Simultaneously with shear stress decay, fluid moves in the opposite direction to that of the imposed motion in a subset of the gap (*i.e.*, back flow). Consistently with theory, the back flow strengthens as elasticity number increases. However, at very high elasticity numbers, the transient backflow disappears, contrary to the same theoretical predictions. In addition to the back flow, a multiple shear band structure forms in the transient flow at high elasticity numbers. These transient multiple bands persist to steady state. We surmise that the lack of back flows at high elasticity numbers is linked the formation of transient multiple bands.

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