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Asymmetric instabilities in the flow of thin films on fibers CHASE GABBARD, JOSHUA BOSTWICK, Clemson University — Understanding the dynamics of thin-film flow down a vertical fiber is valuable for many coating applications. It is well known that such flows give rise to a number of instabilities that define the bead-on-fiber morphology. These include Plateau-Rayleigh breakup, isolated bead formation, and convective instabilities, all of which leave the interface shape axisymmetric. We conduct experiments that reveal an asymmetric instability in the flow of liquid on a fiber, which depends critically upon the liquid properties, flow rate and fiber radius, and we document this dependence on the observed morphology. Multiple liquids were used to change the viscosity and surfactant is used to change the surface tension in order to capture the transition between symmetric and asymmetric. Interestingly, we observe that under certain conditions in the transition region the instability may change from asymmetric to symmetric at some distance down the fiber.

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