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Droplet climbing on a pre-wetted conical fibre ZHEN JIAN, ERQIANG LI, S. T. THORODDSEN, King Abdullah University of Science and Technology (KAUST) — We study the motion of a droplet on a wet conical fibre. The conical fibres are fabricated with a glass-puller, with tip diameters of several μm. With liquid is fed through the hollow fibre and travels up the outside of the cone, forming a droplet, which is initially attached near the tip. This drop grows in size and then detaches and moves on the fibre, at velocities up to 0.25 m/s. We focus on the regime with small Bond number $Bo = \rho g R^2/\sigma$ and capillary number $Ca = \mu U/\sigma$, where the droplet motion is driven by the pressure gradient due to the continuous curvature change along the conical fibre. High-speed imaging and numerical simulations via the Gerris code are employed to investigate the dynamics of the droplet detachment and climbing. Our focus is on the interface profile near the tip, the mechanism of droplet formation and climbing, and the velocity field in the thin liquid layer on the cone.

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