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Forces to Dislodge Rotating Sessile and Pendant Annular Rivulets P.D. WEIDMAN, University of Colorado, Boulder, C.P. MALHOTRA, TCS Innovation Labs, Pune, India — In a recent PRL Tadmor, et al (2009) measured the lateral adhesion force on sessile and pendant drops (oil) of equal volume placed at R = 100 cm on a rotating flat surface (treated mica substrate) and found that more force is required to radially displace the pendant drops. This was explained as enhanced chemical interaction between liquid and solid molecules when the drop is pendant compared to sessile. We take the view it is primarily static advancing and receding contact angles that govern the movement of the drops. This is shown by a simple model where the isolated drop is replaced by a thin axisymmetric rivulet. For realistic advancing and receding contact angles of water on anodized aluminum, computations performed show the existence of four distinct regions governing drop movement. The three regions found at small radii give way at R = 2.0 cm to the final fourth region where drop movement depends on the advancing contact angle for both sessile and pendant drops; here the pendant drops require a larger radial force to dislodge, in agreement with the mesurements of Tadmor, et al. Simulations more closely mimicking the experiments of Tadmor, et al will be presented.

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