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Drop stability in wind: effect of solid protrusion ALIREZA HOOSHANGINEJAD, BENJAMIN WILCOX, EDWARD WHITE, SUNGYON LEE, Texas A&M University — We experimentally investigate the inertia-driven onset of droplet depinning behind a solid protrusion inside a wind tunnel. In the high Reynolds number regime, the separation and reattachment of the boundary layer in the presence of the solid protrusion directly lead to complex behavior of the partially wetting water drop as a function of its position. For varying droplet volumes and droplet positions from the protrusion, we measure the critical wind velocity at which the drop starts to depin. In particular, drops in a certain volume range are observed to reverse their depinning direction at a critical distance from the solid. By coupling the boundary layer characteristics with droplet dynamics, we explain the physical mechanism of the resultant droplet behavior.

Sungyon Lee
Texas A&M University

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