Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Drop impact on a coated inclined surface SUHAS RAO TAMVADA, VARUN KULKARNI, NIKHIL SUBHASH SHIRDADE, GAURAV KULKARNI, SUSHANT ANAND, University of Illinois at Chicago — The impact of a drop onto a surface is useful in assessing the water repelling attributes of substrates with a given wettability. Most studies have focused on droplet impact on horizontal flat surfaces however oblique impact of a droplet onto a surface, representing more accurate scenarios such as impact onto turbine blades leading to ice accretion and pesticide spraying has not been investigated. To this end we study the gentle deposition of a droplet at different temperatures on paraffin wax coated on an inclined copper surface. We measure the distance and average velocity of droplet until it comes to a halt to evaluate the role of the impact conditions and surface inclination on the observed sliding behavior. As we increase droplet temperature enhanced melting of the wax layer promotes sliding of the droplet to larger distances eventually being arrested by the viscous drag due to the underlying melted wax layer. Of significant interest is the deviation from the typical stick-slip motion reported on inclined hydrophobic surfaces. Our studies evaluate the efficacy of wax coatings in promoting self-cleaning on inclined surfaces and their possible use in applications which demand expeditious shedding of droplets.

Suhas Tamvada
University of Illinois at Chicago

Date submitted: 16 Sep 2019 Electronic form version 1.4