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Liquid Drop Impingement on Superhydrophobic Surfaces JOHN PEARSON, DANIEL MAYNES, BRENT WEBB, Brigham Young University — We report results of an experimental investigation of liquid drops impinging on structured superhydrophobic surfaces. The surfaces are fabricated in Silicon wafers with micro-ribs and cavities (grooves) that are subsequently coated with two different hydrophobic coatings. Liquid droplets of known size were dropped from heights ranging from 0.5 to 50 cm onto the surfaces and the resulting impact and droplet deformation was imaged at a rate of 6000 frames/second with a digital camera. Tests were conducted on structured and coated surfaces, structured and uncoated surfaces, and coated and uncoated smooth surfaces. The droplet impact speed, maximum droplet spread, horizontal spread speed, vertical speed of the issuing jet, and the time between impact and formation of the issuing jet were all characterized. The results show that the overall impact dynamics are influenced significantly by the different impinging surface conditions. In general the maximum droplet spread and the speed of the spread are greater in the direction aligned with the ribs/cavities than aligned in the transverse direction. Further, the results suggest a dependence on the relative rib/cavity size. Correlated results in terms of the governing dimensionless parameters provide insight into the underlying physics.

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