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Drop impact on inclined superhydrophobic surfaces[1] WONJAE CHOI, SANI LECLEAR, JOHNATHON LECLEAR, . ABHIJEET, University of Texas at Dallas, KYOO-CHUL PARK, Harvard University — We report an empirical study and dimensional analysis on the impact patterns of water drops on inclined superhydrophobic surfaces. While the classic Weber number determines the spreading and recoiling dynamics of a water drop on a horizontal / smooth surface, for a superhydrophobic surface, the dynamics depends on two distinct Weber numbers, each calculated using the length scale of the drop or of the pores on the surface. Impact on an inclined superhydrophobic surface is even more complicated, as the velocity that determines the Weber number is not necessarily the absolute speed of the drop but the velocity components normal and tangential to the surface. We define six different Weber numbers, using three different velocities (absolute, normal and tangential velocities) and two different length scales (size of the drop and of the texture). We investigate the impact patterns on inclined superhydrophobic surfaces with three different types of surface texture: (i) posts, (ii) ridges aligned with and (iii) ridges perpendicular to the impact direction. Results suggest that all six Weber numbers matter, but affect different parts of the impact dynamics, ranging from the Cassie-Wenzel transition, maximum spreading, to anisotropic deformation.

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