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Two-Pronged Jet Formation Caused by Droplet Impact on Anisotropic Superhydrophobic Surfaces JOHN PEARSON, DANIEL MAYNES, DAVID BILODEAU, BRENT WEBB, Brigham Young University — When a liquid droplet impacts a horizontal superhydrophobic surface with anisotropic surface patterning in the form of alternating ribs and cavities, the rebounding droplet can exhibit a unique two-pronged jet emission under certain conditions. This behavior occurs as a result of the unequal shear stresses and dynamic contact angles that exist along the two major axes: parallel and perpendicular to the ribs/cavities. Due to these unequal conditions in the two major directions, the droplet spread and collapse occurs more rapidly in the direction parallel to the ribs/cavities than the transverse direction. Droplet impact experiments with eleven different fluids of viscosity that varied by more than three orders of magnitude were conducted, and the ranges of Capillary number, Ca, and Ohnesorge number, Oh, over which the two-pronged phenomenon occurs have been quantified. Further, the probability of the two-pronged jet emission has been quantified as a function of Oh and Weber number, We. For $Oh > 0.0154$, the behavior was never observed, while at lower values of Oh, the behavior occurs for an intermediate range of Ca that depends on Oh.

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