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The effect of contact angle hysteresis on droplet motion and collisions on superhydrophobic surfaces MICHAEL NILSSON, JONATHAN ROTHSTEIN, University of Massachusetts Amherst — The effect of varying the contact angle hysteresis of a superhydrophobic surface on the characteristics and dynamics of water droplet motion and their subsequent collision are investigated using a high-speed camera. The surfaces are created by imparting random roughness to Teflon through sanding. With this technique, it is possible to create surfaces with similar advancing contact angles near 150 degrees, but with varying contact angle hysteresis. This talk will focus on a number of interesting experimental observations pertaining to drop dynamics along a surface with uniform hysteresis, drop motion along surfaces with transition zones from one hysteresis to another, and the collision of droplets on surfaces of uniform hysteresis. For single drop studies, gravity is used as the driving force, while the collision studies use pressurized air to propel one drop into the other. For the case of droplet collision, the effect of hysteresis, Weber number, and impact number on the maximum deformation of the drops, and the post-collision dynamics will be discussed. For the single droplet measurements, the resistance to motion will be characterized as well as the transition from rolling to sliding as a function of drop size, inclination angle, and hysteresis. Additionally, we will quantify the effect of surface transitions on the resulting motion, mixing, and deflection of the drops.

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