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Spreading Dynamics of a Droplet over a Superhydrophobic Surface NIKHIL BHOLE, CHARLES MALDARELLI — Aqueous droplet on a microtextured, superhydrophobic surface shows two distinct wetting behaviors, the Wenzel wetting and the Cassie-Baxter wetting. Most research efforts have focused on static energy arguments in which the overall surface energies of the Wenzel and Cassie-Baxter wetting states are compared to discern which is favored as a function of the surface topography and intrinsic surface energy. In this presentation we will construct a more relevant picture by examining the hydrodynamics of the wetting process on the scale of the topography. Our aim is to understand how the flow interacts with the topography to determine the wetting regime. We study the two dimensional spreading due to gravity of an aqueous drop over a well defined topographical pattern consisting of a periodic array of micron-sized posts. The flow in the droplet is assumed to be in the Stokes flow regime, and a boundary integral method is used for numerical solution with slip at the contact line and a velocity dependent relation for the dynamic wetting contact angle. The contact line shows a distinct slip-stick-jump (or slip-stick-penetration) motion over the topography determining the state of wetting.

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