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Towards Feature-Resolved Simulations of Superhydrophobic Surfaces[1] YIXUAN LI, KARIM ALAME, KRISHNAN MAHESH, University of Minnesota — Superhydrophobic surfaces have potential for viscous friction reduction, anti-corrosive protective coatings and self-cleaning techniques. Most previous studies focused on large scale grooves or pillars in the laminar regime. In this study, two fully covered microtextured superhydrophobic surfaces and two unit microtextured surfaces with different geometries (grooves and posts) are tested in both laminar and turbulent flows using DNS. Slip length and discharge are computed in the laminar regime and compared with theoretical estimate and experiment. The turbulent simulations are performed for both "unit cells" as well as the entire textured surfaces. Fully wetted simulations reveal the effect that geometry alone exerts. A volume of fluid methodology is being developed towards allowing for air/water interfaces inside the grooves, and will be discussed.

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