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Superhydrophobic Surfaces for Turbulent Drag Reduction: Effect of Geometry and Reynolds Number ROBERT DANIELLO, JONATHAN P. ROTHSTEIN, University of Massachusetts, Amherst — Recently, it has been demonstrated that superhydrophobic surfaces are capable of reducing drag in turbulent flows. Superhydrophobic surfaces are chemically hydrophobic with micron or nanometer scale surface features which can support a shear-free air-water interface. In this talk, we will consider the effect of microfeature geometry and flow velocity on the observed drag reduction. Microridge geometries from 15μm to 60μm will be considered with shear free area ratios from 20% to 80%. Drag reductions are found to increase with increasing shear free area ratio up to 75%. For any given shear free area ratio, drag reduction was seen to initiate at lower Reynolds numbers for larger microfeature spacings. Experiments were conducted over the range of Reynolds numbers $1000<Re<100000$, demonstrating that drag reduction in the turbulent regime is distinct from drag reduction observed over superhydrophobic surfaces in the laminar regime and persists well past transition to turbulence.

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