

Abstract Submitted
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Drag reduction over liquid-infused surfaces in turbulent Taylor-Couette flow¹ TYLER VAN BUREN, BRIAN ROSENBERG, Princeton University, ALEXANDER SMITS, Princeton University and Monash University — We present an experimental study on aqueous turbulent flow over a liquid-infused textured surface for the purpose of drag reduction. Taylor-Couette flow experiments are performed over a range of laminar to turbulent conditions ($Re = 1500$ to 7000), where the skin friction is compared to (i) a baseline case that consists of a textured surface with no impregnated fluid and (ii) an air-impregnated superhydrophobic surface. We achieve drag reduction as high as 11% with superhydrophobic surfaces and 4% with liquid infused surfaces. Of particular interest in this study is (1) the impact of surface texture shape and gap size on the resulting surface skin friction, (2) the importance of the viscosity ratios of the two fluids and its relationship to drag reduction, and (3) longevity of effectiveness when comparing liquid- to air-infused surfaces.

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