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Flow over slippery liquid-infused porous surfaces BRIAN ROSENBERG, GILAD ARWATZ, JESSICA SHANG, ALEXANDER SMITS, Princeton University — Slippery liquid-infused porous surfaces (SLIPS) demonstrate remarkable liquid repellency in addition to high pressure stability and rapid self-healing [T.S. Wong et al., Nature 2011]. The SLIPS surface consists of a thin lubricating film, locked in place on a nano-textured membrane, that permits mobility of the surrounding liquid at the interface. The relaxation of the no-slip boundary condition, in addition to their robustness in high-stress environments, means that these surfaces have promise to reduce drag in engineering flows. Here, we investigate the response of SLIPS in the laminar, transitional, and turbulent flow regimes. Experiments are performed in a Taylor-Couette apparatus, with water as the working fluid, over a wide Reynolds number range and with varying lubricant viscosities. We assess the skin friction properties of SLIPS surfaces and compare it to those of untreated surfaces.

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