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Flow around a superhydrophobic cylinder[1] JESSICA SHANG, BRIAN ROSENBERG, PETER DEWEY, HOWARD STONE, Princeton University, ALEXANDER SMITS, Princeton University, Monash University — The boundary condition on a circular cylinder is varied through the use of superhydrophobic surfaces, which introduce a partial-slip boundary condition. We examine the effect of these surfaces on the separation behind a cylinder in the Reynolds number range $15 < Re_D < 1600$. Two different superhydrophobic surfaces are compared with a smooth untreated surface: a conventional superhydrophobic surface consisting of a aluminum hydroxide networked nanostructure with an air-water interface, and a slippery liquid-infused surface (SLIPS) that is similarly nanostructured. We find no change in the critical Re_D or the vortex shedding frequency. An increase in the vortex formation length, generally associated with a decrease in base suction, occurs for the air-water interface for $300 < Re_D < 900$, but not for SLIPS. Superhydrophobic surfaces appear to have no similar effect at higher Re_D in the shear layer transition regime.

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