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Transition Regimes of Jet Impingement on Rib and Cavity Superhydrophobic Surfaces MICHAEL JOHNSON, DANIEL MAYNES, BRENT WEBB, Brigham Young University — We report experimental results characterizing the dynamics of a liquid jet impinging normally on superhydrophobic surfaces spanning the Weber number (based on the jet velocity and diameter) range from 100 to 2000.The superhydrophobic surfaces are fabricated with both silicon and PDMS surfaces and exhibit micro-ribs and cavities coated with a hydrophobic coating. In general, the hydraulic jump exhibits an elliptical shape with the major axis being aligned parallel to the ribs, concomitant with the frictional resistance being smaller in the parallel direction than in the transverse direction. When the water depth downstream of the jump was imposed at a predetermined value, the major and minor axis of the jump increased with decreasing water depth, following classical hydraulic jump behavior. When no water depth was imposed, a regime change was observed within the Weber number range explained. For We < 1200, the flow forms a filament at the edge of the ellipse, where the flow moves along the rim of the ellipse toward the major axis. The filaments then join and continue to move parallel to the ribs. For $1200 <$ We < 1800, the filaments beyond the ellipse break into multiple streams and droplets and begin to take on a component perpendicular to the ribs. For We > 1800 a small amount of water flows purely in the transverse direction.

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