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A Passive Drag Reduction Surface Design[1] CONG WANG, DAVID JEON, MORTEZA GHARIB, Caltech — Super hydrophobic surface could induce an air layer over the surface when submerged in water. This air layer is responsible for many fascinating properties of super hydrophobic surface, such as drag reduction. Unfortunately, the air layer is fragile and can be depleted by fast shear/turbulent flow. In this work, a dimpled surface with non-uniform surface wettability is proposed to increase the air layer stability by trapping air in individual dimples. A central pumping system is connected to each dimple to supply air and regulate pressure inside air bubble. Particle Image Velocimetry (PIV) is used to investigate the drag reduction effect of different geometry designs.

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Cong Wang
Caltech

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