Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Unidirectional superhydrophobic surfaces[1] MANU PRAKASH, JOHN BUSH, MIT — It has long been known that the hairy, waxy cuticle of water-walking insects renders them water-repellent; they thus exhibit high static contact angles. We have recently demonstrated that by the virtue of the geometry and flexibility of the hair, the integument is also directionally anisotropic and so plays a key propulsive role. We here report our attempts to design and implement an analogous synthetic surface that exhibits unidirectional adhesion. The surface effectively acts like a fluidic-diode; allowing contact lines to advance in only one direction. When vibrated randomly, drops suspended on the surface advance in only one direction. Applications in valve-less pumps and drop transport in microfluidic devices are discussed.

[1]Center for Bits and Atoms, NSF grant CCR-0122419.

Manu Prakash
MIT

Date submitted: 03 Aug 2007 Electronic form version 1.4