Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

The "fakir drop": a (un)stable situation MATHILDE CALLIES-REYSSAT, DAVID QUÉRÉ, Collège de France, Paris — Hydrophobic surfaces can be made super-hydrophobic by creating a texture on them. This effect, sometimes referred to as the "fakir effect," is due to air trapping in the structure, which provides a composite surface made of solid and air on which the deposited drop sits. Here we give evidence for this effect using forests of micro-pillars, made by photolithography and deep etching. This allows us to control the density of solid and air under the drop, and thus the degree of super-hydrophobicity. However, the "fakir state" is not always the most stable situation for a drop on a hydrophobic surface. The drop may instead fill the microstructure and this other state, called the "Wenzel state," has very different properties. We show how to observe transitions between these two states. We also achieve materials with a density gradient of micropillars, and discuss the possibility of inducing spontaneous drop motion on such surfaces.

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Date submitted: 29 Jul 2005 Electronic form version 1.4