Comment on “Large Slip of Aqueous Liquid Flow over a Nanoengineered Superhydrophobic Surface”

In a recent Letter [1], Choi and Kim reported slip lengths of a few tens of microns for water on nanoengineered superhydrophobic surfaces, on the basis of rheometry (cone-and-plate) measurements. We show that the experimental uncertainty in the experiment of Ref. [1], expressed in terms of slip lengths, lies in the range 20–100 μm, which is precisely the order of magnitude of the reported slip lengths. Moreover, we point out a systematic bias expected within uncertainty. If the uncertainties on the filling volume and on the radius M of the order of a few tens of micrometers. See also note [3].

In summary, the experimental uncertainty that we estimate is comparable to the amplitude of the effect the authors have observed. Moreover, a systematic bias could be wrongly interpreted in terms of very large slippage on superhydrophobic surfaces. The experiments of Ref. [1] are therefore inconclusive.

Lydéric Bocquet,1 Patrick Tabeling,2 and Sébastien Manneville3
1LPMC
Université Lyon I
UMR CNRS 5586, Lyon, France
2PCT
ESPCI
UMR CNRS 7083, Paris, France
3CRPP
UPR CNRS 8641, Pessac, France

Received 4 April 2006; published 7 September 2006
DOI: 10.1103/PhysRevLett.97.109601
PACS numbers: 83.50.Rp, 47.45.Gx, 68.08.Bc, 81.40.Pq

[3] To fix the ideas, a retreat of ~0.2 mm in the average position of the edge meniscus could be misinterpreted as a slip length increase of ~14 μm. This underlines the importance of an effect which was erroneously overlooked in Ref. [1].