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Morphology of liquids spreading along open nanofluidic channels[1]

ANTONIO CHECCO, Brookhaven National Laboratory — Dynamic atomic force microscopy (AFM) in the non-contact regime is used to study the morphology of a non-volatile liquid (squalane) as it spreads along wettable nanostripes embedded in a non-wettable surface. AFM allows the direct observation of the microscopic contact line of spreading nanoliquids with unprecedented spatial resolution. Results show that the liquid profile depends on the amount of lateral confinement imposed by the nanostripes and it is truncated at the microscopic contact line in good qualitative agreement with classical mesoscale hydrodynamics. However, the width of the contact line is found to be significantly larger than expected theoretically. This behavior may originate from small chemical inhomogeneity of the patterned stripes as well as from thermal fluctuations of the contact line.

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