Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Probing wetting at the nanoscale[1] KEVIN LIPPERA, Ecole Polytechnique, CAROLINE MORTAGNE, THIERRY ONDARCUHU, CEMES, MICHAEL BENZAQUEN, Ecole Polytechnique, LADHYX TEAM, CEMES TEAM — Understanding the physics of wetting is a major issue which comes into play in many applications such as smart materials and bio-mechanical research. The aim of the present work is to study wetting at the nano-scale using Atomic Force Microscopy (AFM). To serve as AFM tips, we design very specific nano-needles with radii below 100 nm fitted with controlled nanometric defects. Dipping the tips into a liquid and using the FM-AFM mode, we are able to monitor the forces and the dissipation induced by the dynamics of the nano-meniscus anchored on the defects. We develop a theoretical model successful at reproducing more than 90 experiments with different liquids, tips and defect sizes. This unprecedented technique coupled with robust theoretical modeling is very promising to address still unanswered questions such as the dissipation of moving contact lines, and in particular confront the Cox-Voinov and de Gennes models.

[1]This study has been partially supported through the ANR by NANOFLUIDYN project (grant ANR-13-BS10-0009)

Kevin Lippera
Ecole Polytechnique

Date submitted: 26 Jul 2017 Electronic form version 1.4