Abstract Submitted
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On the origin of surface fraction scaling for receding contact angles on textured superhydrophobic surfaces ETIENNE BARTHEL, ESPCI/CNRS, JEREMIE TEISSEIRE, CNRS/Saint-gobain, MARCO RIVETTI, MPI DS / Goettingen — It has long been recognized that surface fraction is a relevent parameter to rationalize the receding contact angle on textured superhydrophobic surfaces [1]. This notion can easily be rationalized from a simple surface energy averaging procedure, which leads to the Cassie relation. The concept has recently been challenged because it is unclear how surface averaging could apply to a line, and line averaging often provides a better fit to the data [2]. We have revisited this problem by exploring strongly anisotropic surfaces for which surface fraction and line fraction scalings are clearly differentiated. Our experimental and simulation results suggest that surface fraction scaling originates from line defects. Since these defects straddle rows, they probe both lattice dimensions, whereby surface fraction scaling emerges. However, our results also show that strict proportionality as predicted by the Cassie relation does not hold: a much more singular behavior is found at low surface fractions, in keeping with the near-threshold behaviour expected from a depinning process [3]. [1] QUÉRÉ, D. Annu. Rev. Mater. Res. 38 (2008) 71 [2] CHOI, W.; A. et al. J. Colloid Interf. Sci. 339 (2009) 208 [3] RIVETTI et al. Phys. Rev. Lett. 115 (2015) 016101

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