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Thickness effect in the statics and dynamics of wetting on soft materials MENGHUA ZHAO, CNRS UMR 7615 - ESPCI PARIS; CNRS UMR 7057 - Universit Paris Diderot, MATTHIEU ROCHE, JULIEN DERVAUX, LAURENT ROYON, CNRS UMR 7057 - Universit Paris Diderot, TETSUHARU NARITA, FRANÇOIS LEQUEUX, CNRS UMR 7615 - ESPCI PARIS, LAURENT LIMAT, CNRS UMR 7057 - Universit Paris Diderot, MATIRE ET SYSTMES COMPLEXES - UMR 7057 TEAM, SCIENCES ET INGNIERIE DE LA MATIRE MOLLE - UMR 7615 TEAM — The wetting of liquids on soft materials such as elastomers has received a great deal of attention in the past decades. Many experiments were performed to gain insight into both the statics and dynamics of wetting in such systems, but most neglected the effect of finite thickness of the gel. Here we report results of a study of the thickness effect on both the statics and dynamics of wetting. We vary the thickness of soft silicone elastomers from 10^{-2} to a few mm. First, we develop a quantitative Schlieren optics enabling us to observe the surface deformation after the deposition of droplets. We measure the vertical deformation outside droplets as a function of droplet size, gel thickness and elasticity. We identify a submicrometer-deep dimple, that extends over mm away from the contact line. Second, we characterize the receding dynamics and we show that the dynamic contact angle, hence dissipation, depends on the thickness of the sample. We rationalize our experiments, with an analytical model accounting for the linear elastic response of the gel bulk and its surface tension. We find excellent agreement with experiments.

Menghua Zhao
CNRS UMR 7615 - ESPCI PARIS; CNRS UMR 7057 - Universit Paris Diderot

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