Dynamic Contact Angle of a Soft Solid STEFAN KARPITSCHKA,
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DREOTTI, Univ. Paris-Diderot, JACCO SNOEIJER, University of Twente — The
wetting motion of a liquid on a rigid solid is a multi-scale problem in which viscous
effects at microscopic scales modify the macroscopic liquid contact angle. Here we
show that a contact line moving on a soft elastic substrate also leads to a dynamic
contact angle, but this time, in the solid: the initially flat solid surface is deformed
elastically into a sharp ridge whose angle depends on the contact line velocity. We
predict the dynamic solid contact angle for generic viscoelastic rheologies. The solid
angle provides a mechanism for changing the liquid contact angle, which is corrob-
orated by dynamic wetting experiments of water on silicone gels. Our dynamical
theory for soft wetting also captures the growth or decay of the wetting ridge, as
recently accessed experimentally.

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