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Singular shapes of sliding drops: How to avoid wetting JACCO SNOEIJER, EMMANUELLE RIO, NOLWENN LEGRAND, LAURENT LIMAT, PMMH, Ecole Superieure de Physique et de Chimie Industrielles, Paris — A droplet flowing down a window displays fascinating behaviors, involving bifurcations between singular shapes, drop emission and coalescence, which have only recently been characterized experimentally. In this talk we show how these singular shapes emerge in order to avoid a 'forced' wetting transition: it is the only way for capillary forces to overcome the increasing viscous forces. We analyze the three-dimensional flow in the vicinity of the 'corner' at the rear of the drop, by exploring similarity solutions of the lubrication equations. These predict a self-similar structure of the velocity field that does not depend on the distance to the corner tip, a property that has been verified by Particle Image Velocimetry. We also describe the small-scale regularization of the corner singularity, and a detailed comparison to experiments provides tentative new information on the physics near the contact line.

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