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Force of Adhesion upon loss of Contact Angle Hysteresis: when a Liquid behaves like a Solid JUAN ESCOBAR, Physics Department, Universidad Autónoma Metropolitana-Iztapalapa, México City, 09340, México, ROLANDO CASTILLO, Physics Department, Universidad Nacional Autónoma de México, UNAM — Liquids and solids are in general expected to behave very differently in their contact with a solid surface. While that the mechanical deformation of an elastic solid sphere is perfectly reversible, a liquid drop normally deforms in an irreversible way. Nevertheless, a liquid drop in contact with a perfectly-solvophobic surface should also deform reversibly, giving rise to loss of contact angle hysteresis. In this work,¹ the theoretically predicted vanishment of the macroscopic contact angle hysteresis is found experimentally along with a small but finite force of adhesion $0.55 \mu\text{N}$ that, unexpectedly, is independent of the history of the preload. These results are obtained with a novel Capillary Force Microscope. Our results agree with the prediction of a model in which the surface tension of the liquid provides the counterpart of the restoring force of an elastic solid, evidencing that the dewetting of a liquid in the absence of strong pinning points is equivalent to the detachment of an elastic solid.

¹Escobar J.V. and Castillo R., Phys. Rev. Lett., 111, 22, 226102, (2013)

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