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Stability of Resting Cylinders CUNJING LU, CHRISTOPHE CLANET, DAVID QUERE, PMMH, CNRS, ESPCI, Paris France - Ladhyx, CNRS, Ecole Polytechnique, Palaiseau, France — The capillary instability of a cylinder is a classical topic in the field of fluid interface. As experimentally found by Plateau, the instability happens if the ratio of the wavelength of an axisymmetric fluctuation to the initial diameter of the cylinder is larger than 3.14. We discuss how the fact that the cylinder rests on a superhydrophobic surface (which avoids stabilizing) pining effects modifies this picture. By employing a finite element method, we mainly conclude that: (1) the ratio of the wavelength to the width of the liquid cylinder increases as the liquid cylinders grow; (2) above a critical value D_c of the cylinder diameter, the instability disappears; (3) conversely, decreasing the cylinder diameter restores the instability, yet at a wavelength larger than the Plateau value. This is attributed to the loss of axisymmetry, and discussed more generally by considering the effect of confinement around the cylinder.

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