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On the nature of the Landau-Levich transition GILES DELON, JACCO SNOEIJER, BRUNO ANDREOTTI, MARC FERMIGIER, PMMH-ESPCI, Paris — A solid plate can be wetted dynamically by a non-wetting liquid when withdrawn from a bath above a threshold velocity. Landau and Levich described long ago the scaling relation giving the thickness of the entrained film. However the nature of the transition from a static meniscus to the Landau-Levich remained unclear. We demonstrate experimentally and theoretically that liquid entrainment occurs due to the nucleation of a solitary wave, well below the critical point corresponding to the disappearance of stationary meniscus solutions. It has been suggested by Golestanian and Raphael that the dynamically forced wetting transition is critical with diverging time scales. This critical behavior is actually avoided by the development of the remarkable ridge-like front that does not trivially match to the liquid reservoir. The macroscopic properties of this ridge are governed by stress balance at molecular scale, and provide a novel, sensitive probe to unravel the singularity at the contact line.

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