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Effects of the size of the domain in the evolution of thin films JUAN MANUEL GOMBA, CIFICEN - UNCPBA - CONICET, JONATAN RAUL MAC INTYRE, CIFICEN - UNCPBA - CONICET (Argentina), CARLOS ALBERTO PERAZZO, Departamento de Física y Química, Universidad Favaloro, Solís 453, 1078, Buenos Aires, Argentina — We investigate theoretically the possible final stationary configurations that can be reached by a laterally confined uniform film of liquid. The liquid is under the action of gravity, surface tension and the molecular interaction with the solid substrate. The governing parameters of the problem are the initial thickness of the fluid, the size of the recipient that contains the liquid, and a dimensionless number which quantifies the relative strength of gravity with respect to the molecular interaction. The uniform film is always a possible final state, and depending on the value of the parameters may exist up to 3 different additional final states, each one consisting in a drop with a thin precursor film. We derive analytical expressions for the energy of these possible final configurations, and from this we analyze which one is indeed reached. We conclude that the fluid may show three different behaviors after perturbation: the system recovers its initial shape for any perturbation, the system evolves towards a drop (if more than one is possible, the final state corresponds is the one with the thinnest precursor film) for any perturbation, or the system ends as a uniform film or a drop depending on the details of the perturbation.

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