Abstract Submitted
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Apparent contact angles induced by evaporation into air: interferometric measurements and lubrication-type modeling[1] PIERRE COLINET, YANNIS TSOUMPAS, SAM DEHAECK, ALEXEY REDNIKOV, Universite Libre de Bruxelles, TIPs - Fluid Physics — For volatile liquids, finite contact angles on solid substrates can occur even in the case of perfect wetting, immobile contact lines and ideally smooth surfaces. This is a fluid-dynamic effect due to evaporation typically intensifying towards a small vicinity of the contact line. In the present talk, we first overview recent theoretical results on the subject, where we focus primarily on the case of diffusion-limited evaporation into air. The model is based upon the so-called de Gennes' paradigm, incorporating simultaneously the spreading coefficient and the disjoining pressure in the form of an inverse cubic law. Then we carry out comparison with experimental results for the contact angles of evaporating sessile drops of several perfectly-wetting HFE liquids of different volatility recently obtained by Mach-Zehnder interferometry. The scaling-type theoretical prediction for the apparent contact angle is found to be in good agreement with experimental measurements. Another model based upon the Kelvin effect (curvature dependence of the saturation conditions) is also briefly discussed, an important conceptual feature of which being that contact-line singularities (both evaporation- and motion-induced) can be fully regularized, in contrast with the first model.

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