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Critical inclination for absolute dripping in falling films subject to Rayleigh-Taylor instability BENOIT SCHEID, Universite Libre de Bruxelles, WILKO ROHLFS, Massachusetts Institute of Technology — Liquid films flowing down the underside of inclined plates are subject to film flow instabilities causing a patterned and wavy topology as well as to the classical Rayleigh-Taylor (R-T) instability. The R-T instability results from the denser liquid film being located above a less dense liquid, which is in this case the ambient gaseous phase. Owing to the instability, large amplitude surface deformations form which can result in the formation of droplet and finally droplet detachement if no saturation mechanism arises. This study examines the critical angle for the R-T instability in a falling film between the regime of absolute and convective (A/C) instability using the weighted integral boundary layer approach. In the absence of saturation, the threshold determines whether immediate dripping occurs, e.g. in the entire domain, or if the instability is of convective type, such that waves and eventually drops form while the perturbation is moving downwards the inclined plate.

Benoit Scheid
Universite Libre de Bruxelles

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