Abstract Submitted
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Asymptotic approach in the limit of small contact angles to sessile vapor bubble growth in a superheated environment[1] ALEXEY REDNIKOV, NICOLAS HOLLANDER, MARTA HERNANDO REVILLA, PIERRE COLINET, Université Libre de Bruxelles - TIPs — A model of nucleate pool boiling is considered, and more concretely the growth dynamics of a single spherical-cap vapor bubble on a flat superheated substrate in a large volume of an equally superheated liquid. An asymptotic scheme is developed valid in the limit of small contact angles. These are basically supposed to be the evaporation-induced ones and hence finite even in the case of a perfectly wetting liquid implied here. The consideration generally involves four regions: i) microregion, where the contact line singularities are resolved and the evaporation-induced contact angles are established, ii) Cox-Voinov region, iii) foot of the bubble, and iv) macroregion. It is only in the latter region, which remarkably appears to leading order in the form of the exterior of a sphere touching a planar surface in one point (hence a fixed geometry even for variable contact angles), that the full Navier-Stokes and heat equations are to be (numerically) resolved.

[1]ESA & BELSPO PRODEX, F.R.S.-FNRS

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