3D Numerical Simulation of Droplet Impingement with Pinch-off: Influence of Surface Wettability and Capillarity

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Purpose

Investigate the effect of wettability on the liquid motion in droplet impingement. , elucidate influence of the capillarity on the liquid motion in droplet impingement.

Outline

Droplet impingements with various conditions are simulated with in-house code FK³ [1].

Results

Surface wettability influences the wetting motion (i.e., the temporal evolution of the contact line on the surface), the translational motion of the lamella front is not affected. Wettability has a stronger influence on the vertical motion of the lamella. Lower wettability results in stronger lift in the lamella after the impingement.

Stronger capillarity has a significant influence on the lamella lifted off the surface, whereas the lamella that stays on the surface shows no significant change in its motions with changing capillarity. Stronger capillarity triggers pinch-off in the lamella lifted-off generated after the impingement on the superhydrophobic surface.



Pinch-off in the lamella with strong capillarity

[1] http://www.tse.me.kyoto-u.ac.jp/members/kurose/link.php