Supplementary information

Pinning-depinning transition of droplets on inclined substrates with a three-dimensional topographical defect

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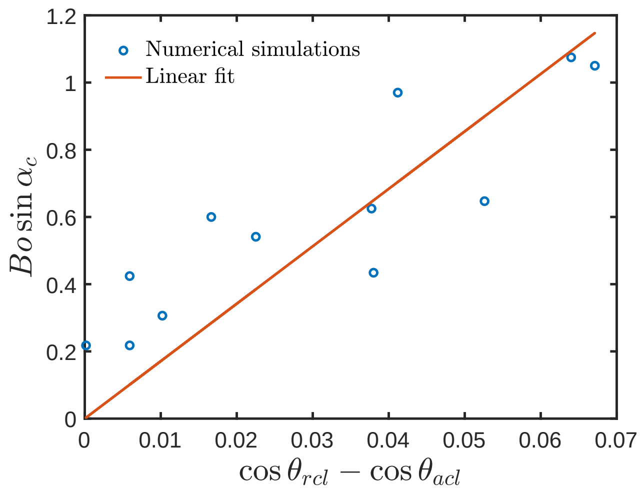

Figure 1: $Bo \sin \alpha_c$ vs. $\cos \theta_{rcl} - \cos \theta_{acl}$. The open blue circles are numerical calculations and the solid red line is a linear fit to the numerical calculations.

Here, we try calculating the value of the retention-force factor k in $Bo \sin \alpha_c = k(\cos \theta_{rcl} - \cos \theta_{acl})$ for a substrate with a topographical defect. This is done by extracting the values of θ_{rcl}, θ_{acl}, and $Bo \sin \alpha$ just before the droplet depins for all the defect geometries presented in §3, and fitting a straight line with an intercept at $y = 0$ to $Bo \sin \alpha_c$ vs. $\cos \theta_{rcl} - \cos \theta_{acl}$.

Figure 1 shows $Bo \sin \alpha_c$ vs. $\cos \theta_{rcl} - \cos \theta_{acl}$, where the open blue circles are numerical calculations and the solid red line is a linear fit. It can be seen that the numerical calculations do not agree well with the linear fit. This likely happens because k is assumed to be a constant in $Bo \sin \alpha_c = k(\cos \theta_{rcl} - \cos \theta_{acl})$, but the value of k is expected to depend on the defect dimensions which are different for all the numerical calculations. The value of k for a given defect geometry can be obtained by calculating α_c for different Bo values and repeating the procedure described above, but such a calculation is beyond the scope of the present paper.