Supplementary Material

Elastocapillary deformations on partially-wetting substrates: rival contact-line models

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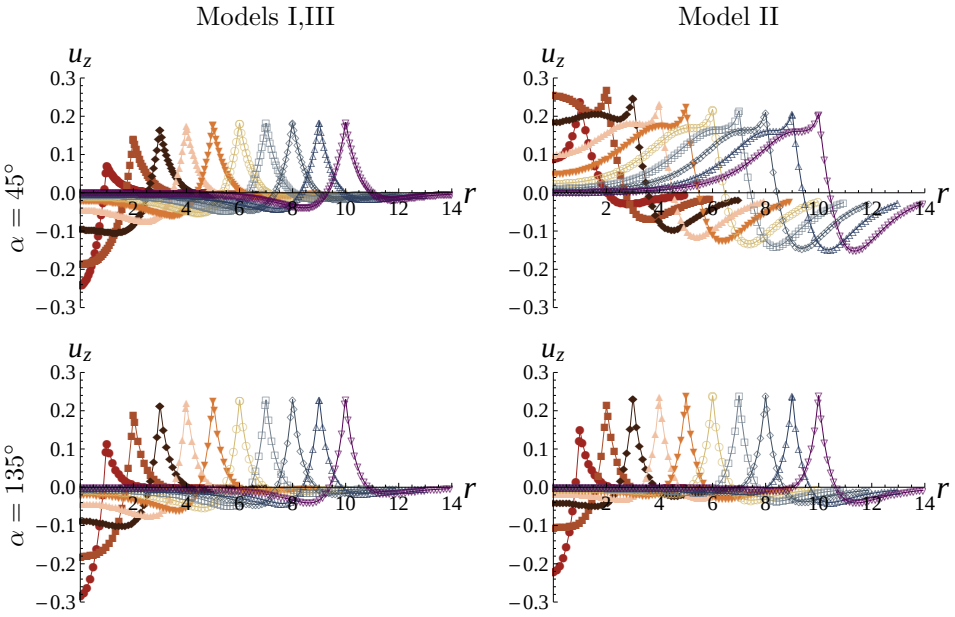

Figure 1: Comparison between Models I,III and II by plotting the axial u_z surface displacement $z = 1$, on an incompressible $\nu = 1/2$ substrate, against r, as it depends upon the contact-line radius Λ, for $\alpha = 45°$ ($\Upsilon_{ls} = 0.5, \Upsilon_{sg} = 1$), and $\alpha = 135°$ ($\Upsilon_{ls} = 1, \Upsilon_{sg} = 0.5$).

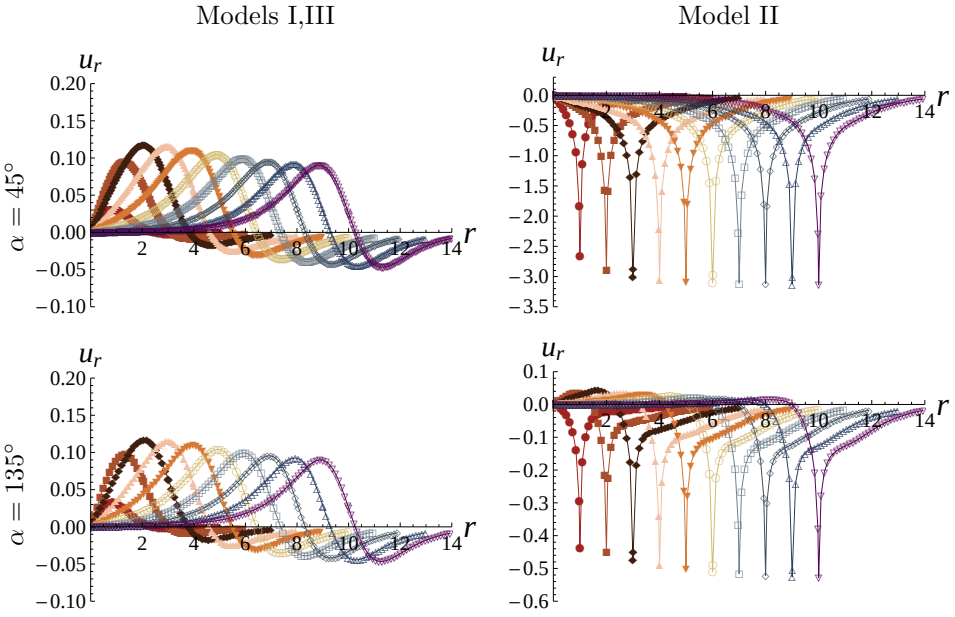

Figure 2: Comparison between Models I,III and II by plotting the axial u_r surface displacement $z = 1$, on an incompressible $\nu = 1/2$ substrate, against r, as it depends upon the contact-line radius Λ, for $\alpha = 45°$ ($\Upsilon_{ls} = 0.5, \Upsilon_{sg} = 1$), and $\alpha = 135°$ ($\Upsilon_{ls} = 1, \Upsilon_{sg} = 0.5$). Note the different scales between Models I,III and II.

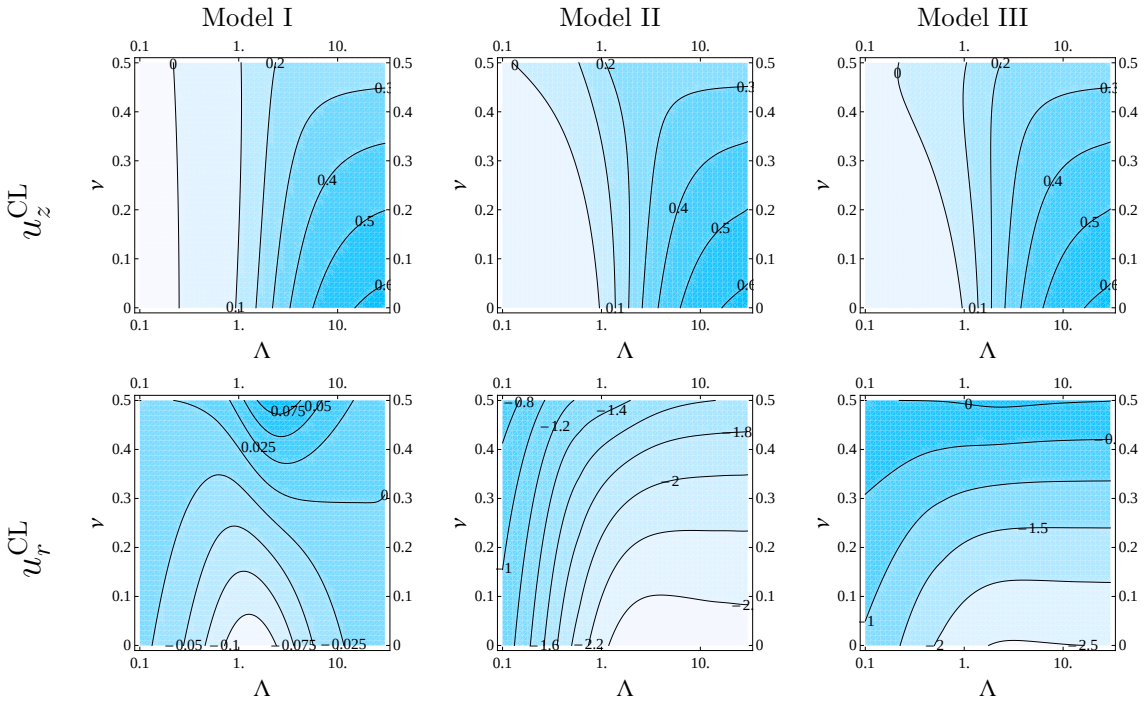

Figure 3: Comparison of the axial u_z^{CL} and radial u_r^{CL} contact-line displacement for Models I,II,III, as it depends upon the Poisson ratio ν and the contact-line radius Λ for $\Upsilon \equiv \Upsilon_{sg} = \Upsilon_{ls} = 1$ and $\alpha = 90°$.

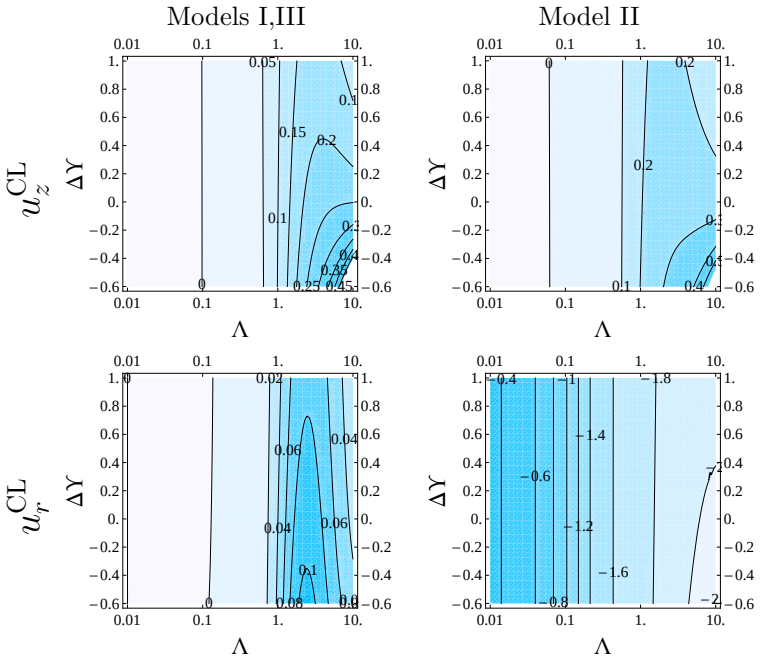

Figure 4: Contact-line displacement comparing Models I,III (a, b) and II (c, d): (a, c) axial u_z^{CL} and (b, d) radial u_r^{CL} displacement at the contact-line $(r = \Lambda)$, as it depends upon $\Delta\Upsilon$ and the contact-line radius Λ for $\nu = 1/2$, $\Upsilon_{sg} = 1$ and $\alpha = 90°$.

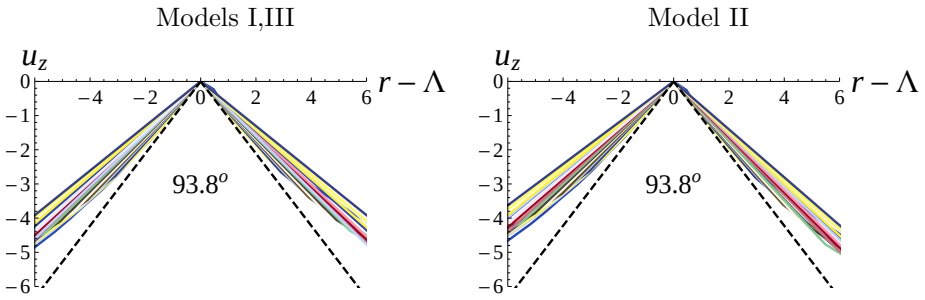

Figure 5: Local geometry of the wetting ridge (cusp) comparing Models I,III and Model II shows a microscopic contact angle of 93.8° for glycerol drops on a silicone substrate. Surface profiles are translated so that the wetting ridge is located at the origin ($r-\Lambda=0$), and then rotated counterclockwise by an angle Ψ so that the line of symmetry is in the vertical direction. Material parameters are taken to be those reported in the experiments by Style *et al.* 2013, Fig. 2(b).

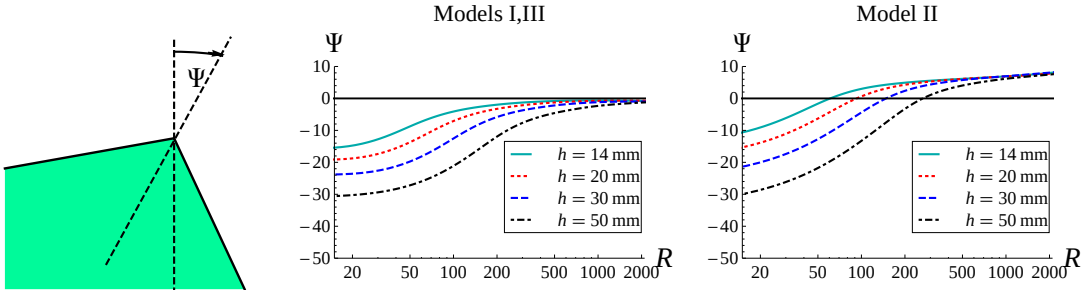

Figure 6: Orientation angle Ψ of the localized triangular shape of the wetting ridge against contact-line radius R, as it depends upon substrate height h, for glycerol drops on silicone substrates. Material properties are taken to be those reported in the experiments by Style *et al.* 2013, Fig. 3.

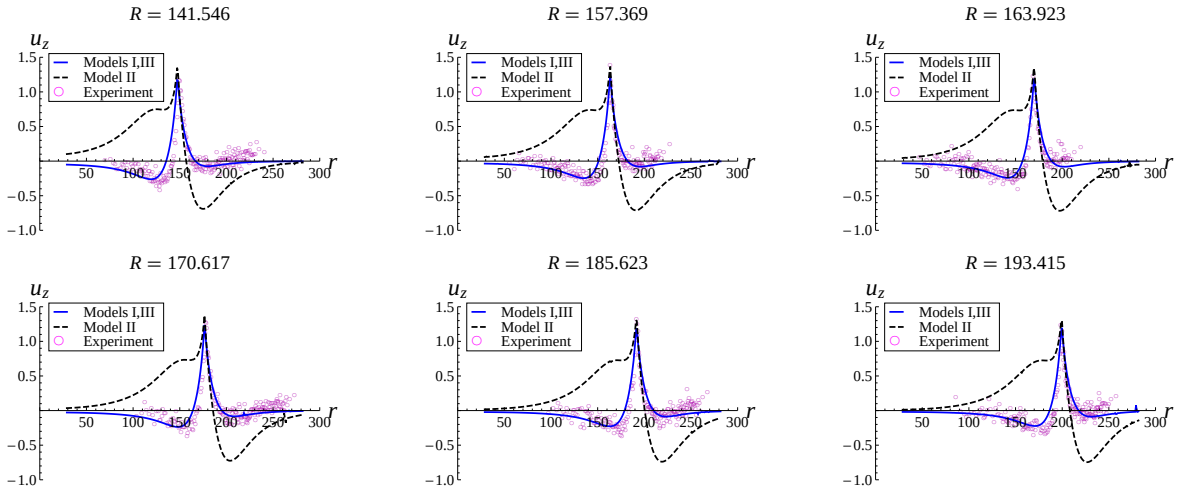

Figure 7: Surface displacement u_z for a flourinert drop on a $h=23\mu$m thick substrate against r comparing Models I,III to Model II, for various contact-line radii R, $\nu=0.5$, $\Upsilon_{sg}=0.349$, $\Delta\Upsilon=0.149$, $E=3$ kPa, $\sigma=17$ mN/m and $\alpha=40°$. Experimental results are shown with open symbols. Material properties are taken to be those reported in the experiments by Style *et al.* 2013.

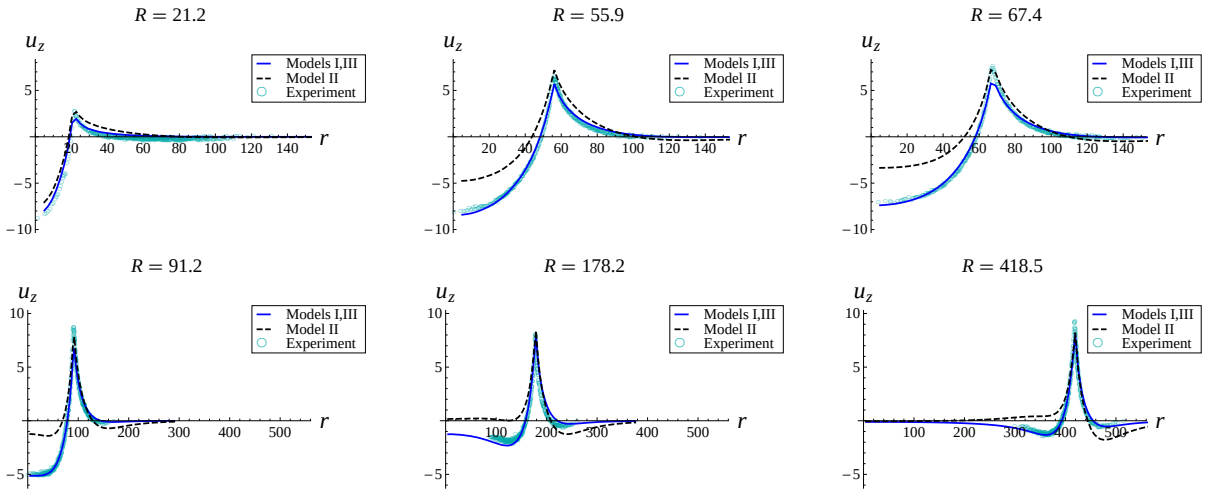

Figure 8: Surface displacement u_z for a glycerol drop on a $h = 50\mu$m thick substrate against r comparing Models I,III to Model II, for various contact-line radii R, $\nu = 0.5$, $\Upsilon_{sg} = 0.207$, $\Delta\Upsilon = -0.033$, $E = 3$ kPa, $\sigma = 46$ mN/m and $\alpha = 95°$. Experimental results are shown with open symbols. Material properties are taken to be those reported in the experiments by Style *et al.* 2013.

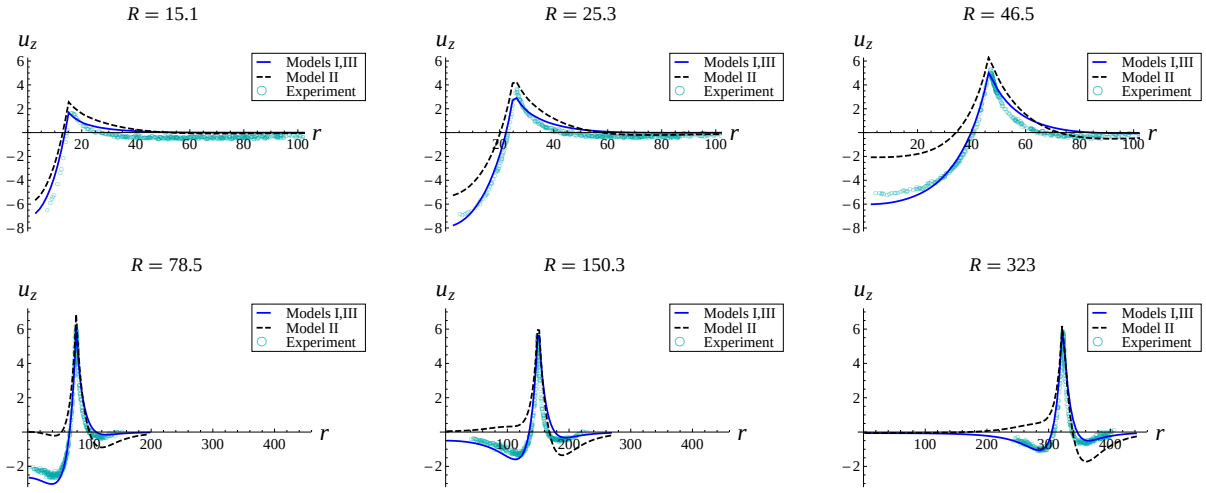

Figure 9: Surface displacement u_z for a glycerol drop on a $h = 30\mu$m thick substrate against r comparing Models I,III to Model II, for various contact-line radii R, $\nu = 0.5$, $\Upsilon_{sg} = 0.345$, $\Delta\Upsilon = -0.055$, $E = 3$ kPa, $\sigma = 46$ mN/m and $\alpha = 95°$. Experimental results are shown with open symbols. Material properties are taken to be those reported in the experiments by Style *et al.* 2013.

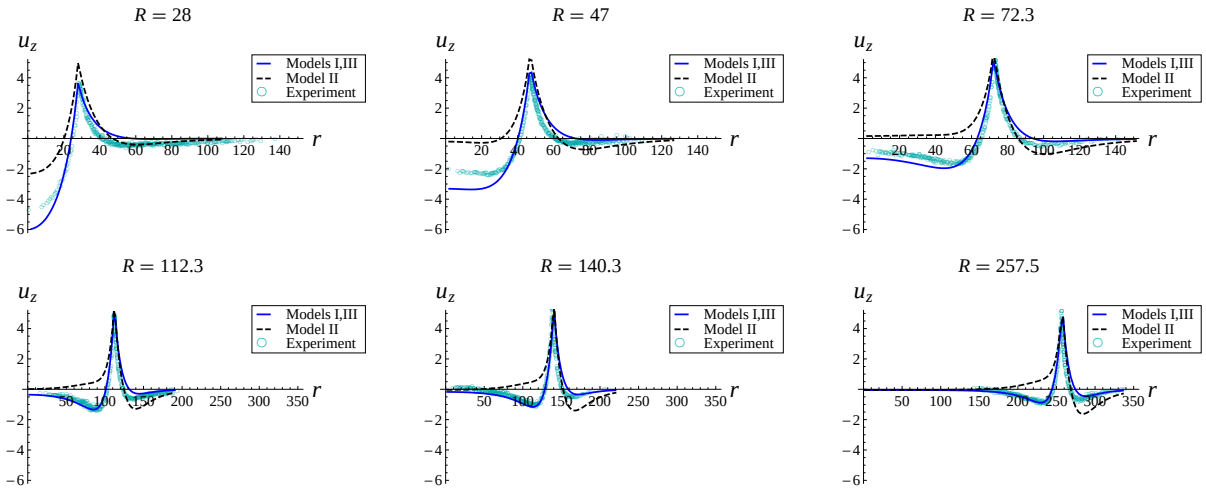

Figure 10: Surface displacement u_z for a glycerol drop on a $h = 20\mu$m thick substrate against r comparing Models I,III to Model II, for various contact-line radii R, $\nu = 0.5$, $\Upsilon_{sg} = 0.518$, $\Delta\Upsilon = -0.083$, $E = 3$ kPa, $\sigma = 46$ mN/m and $\alpha = 95°$. Experimental results are shown with open symbols. Material properties are taken to be those reported in the experiments by Style *et al.* 2013.

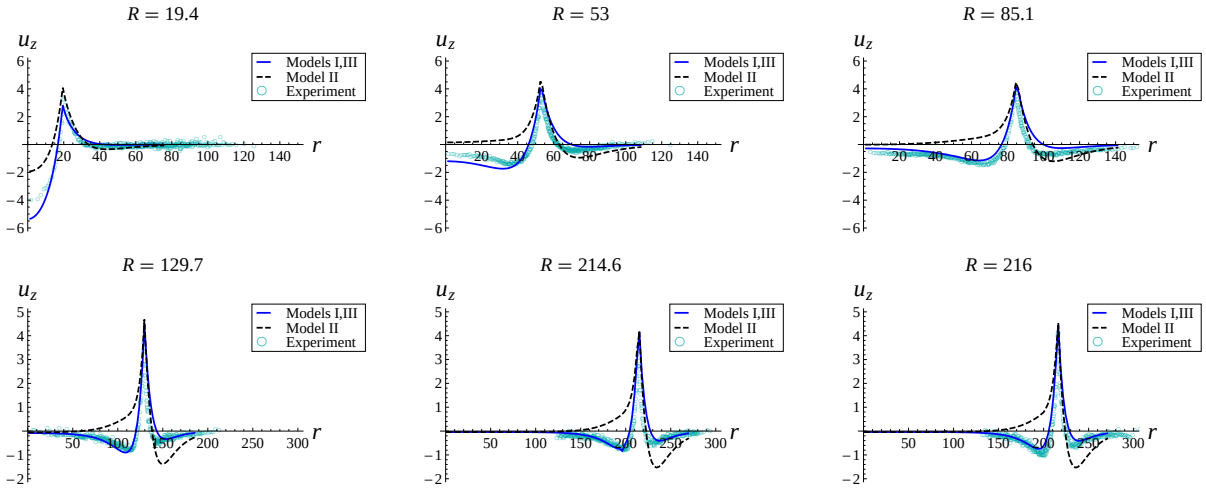

Figure 11: Surface displacement u_z for a glycerol drop on a $h = 14\mu$m thick substrate against r comparing Models I,III to Model II, for various contact-line radii R, $\nu = 0.5$, $\Upsilon_{sg} = 0.739$, $\Delta\Upsilon = -0.118$, $E = 3$ kPa, $\sigma = 46$ mN/m and $\alpha = 95°$. Experimental results are shown with open symbols. Material properties are taken to be those reported in the experiments by Style *et al.* 2013.