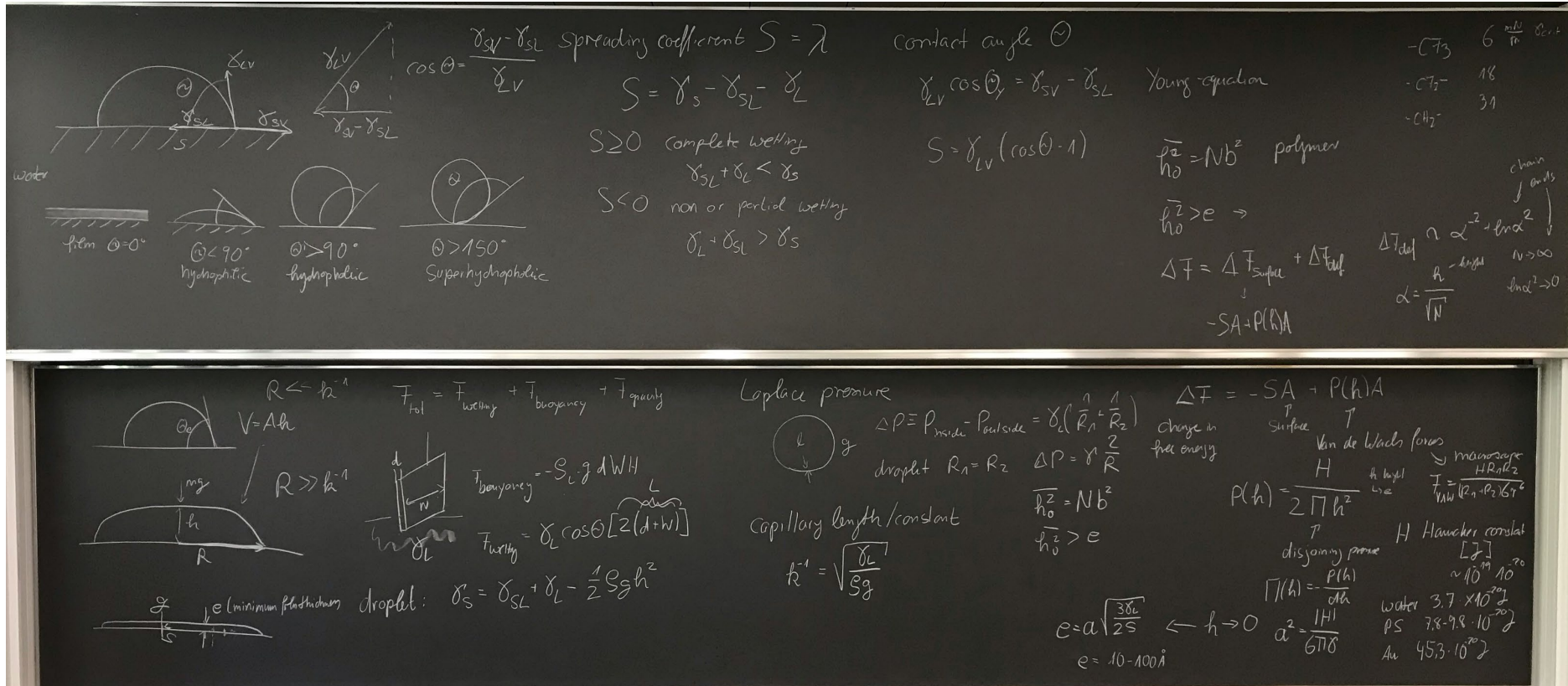


# Course 14 – wetting/dewetting – contact angle



Disjoining pressure  $\Pi$ : difference between the thermodynamic equilibrium state pressure applied to surfaces separated by a film and the pressure in the bulk phase with which the film is in equilibrium.

# Wenzel model

Young  $\cos \theta_y = \frac{\gamma_{sv} - \gamma_{sl}}{\gamma_{lv}}$  surface chemistry term



$$\gamma_{SL} \approx \sqrt{\gamma_S^2 + \gamma_L^2}$$

$$\Delta w_{SL} = 2\sqrt{\gamma_S \gamma_L}$$

$$\cos \theta_y = 2\sqrt{\frac{\gamma_S}{\gamma_L}} - 1$$

$$\theta_y = 120^\circ \rightarrow \gamma_S < 5 \frac{mJ}{m^2}$$



free energy  $dG = \gamma_{LV} dA_{LV} + \gamma_{SV} dA_{SV} + \gamma_{SL} dA_{SL} = 0$

$A$  Surface area introduced  $\rightarrow dA_{LV} = \cos \theta dA_{SL}$

$$dA_{SL} = -dA_{SV}$$

$$(r) = \frac{A}{A'} = \frac{\text{true surface area}}{\text{apparent surface area}}$$

$$r dA_{LV} = \cos \theta dA_{SL}$$

$$\cos \theta_{\text{Wenzel}} = (r) \cos \theta_y$$

