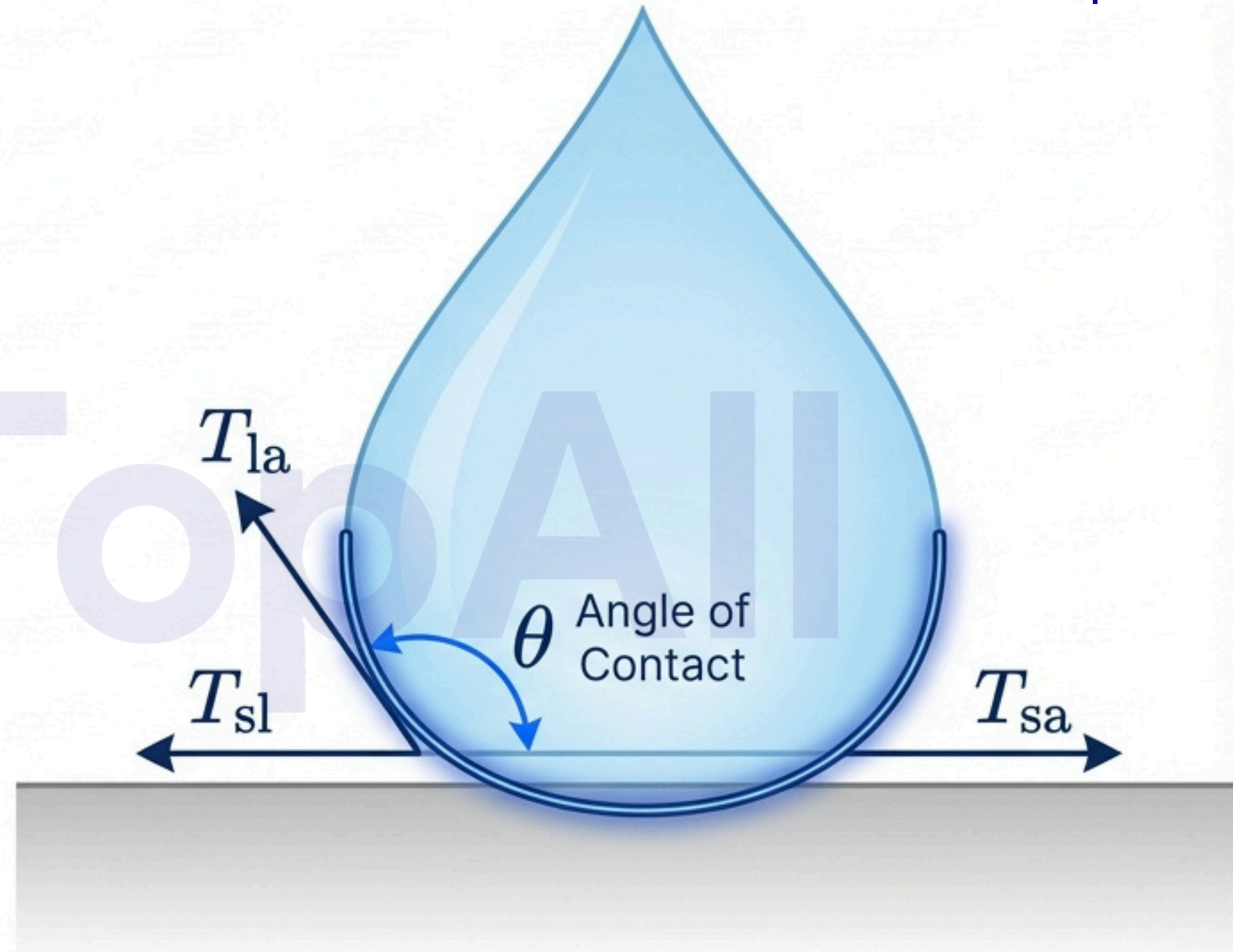


Angle Of Contact

Understanding interfacial tensions, wetting, and liquid equilibrium.

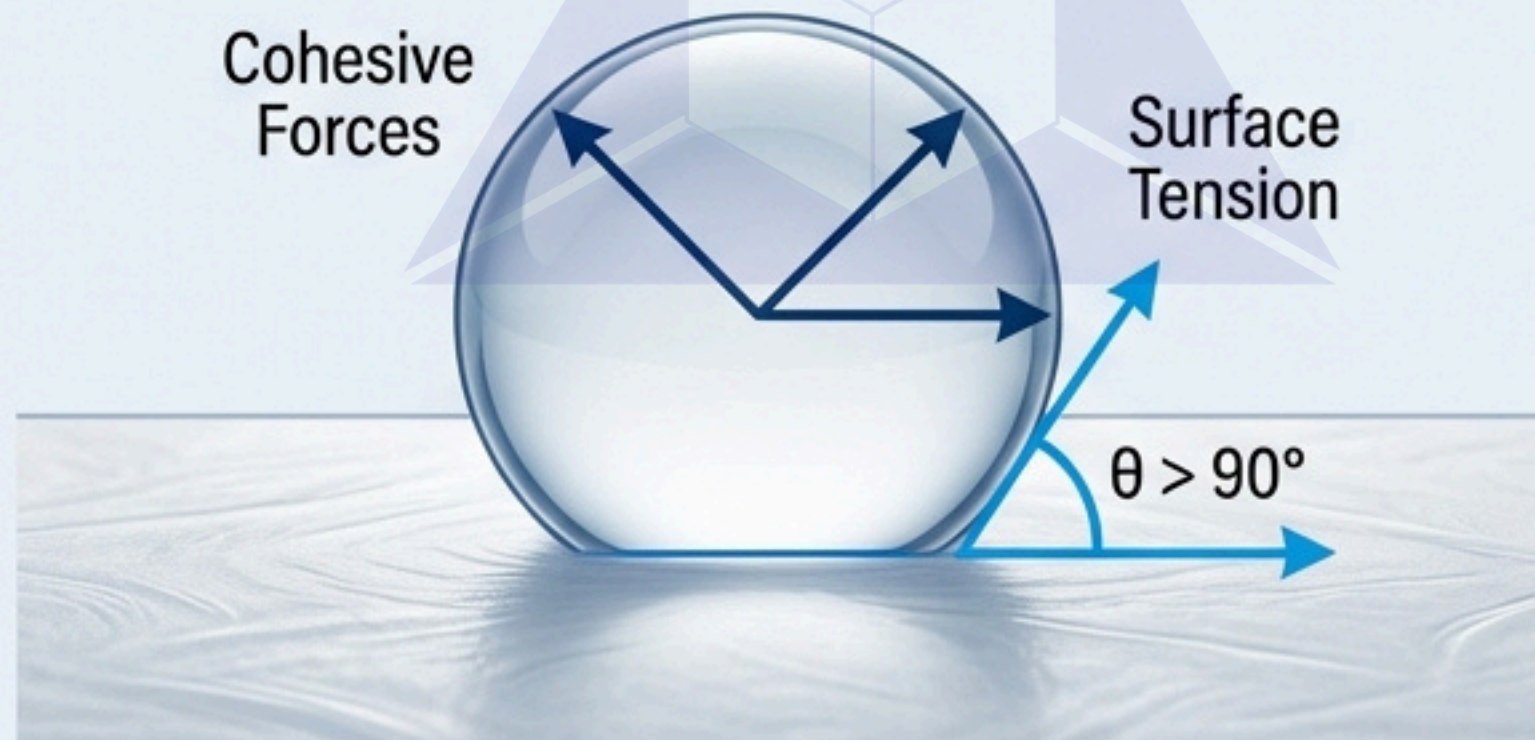


Why Do Liquids Change Shape on Surfaces?

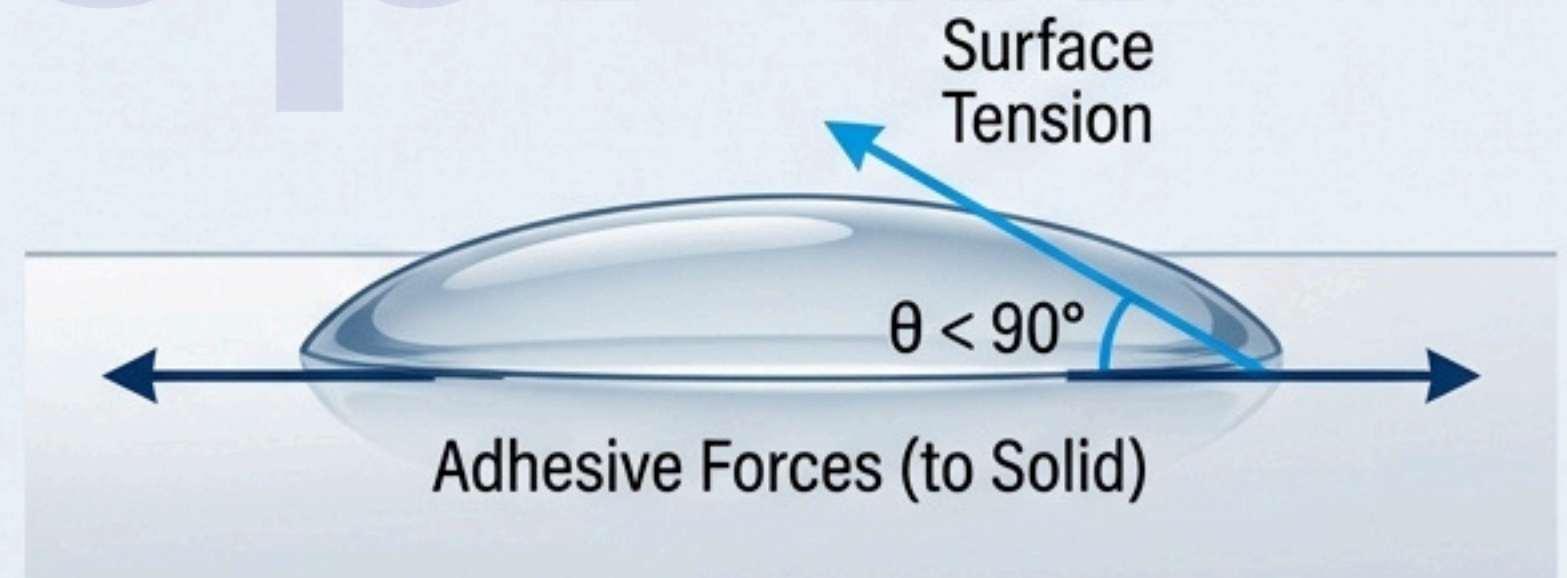
When a liquid interacts with a solid, the shape it takes depends on the **energy at the interfaces**.

- Liquids possess a free surface with extra energy (surface tension).
- The surface curves near the plane of contact with a solid.
- This curvature determines whether a liquid will spread or form droplets.

High Surface Tension (e.g., Water on Wax)



Low Surface Tension (e.g., Alcohol on Plastic)

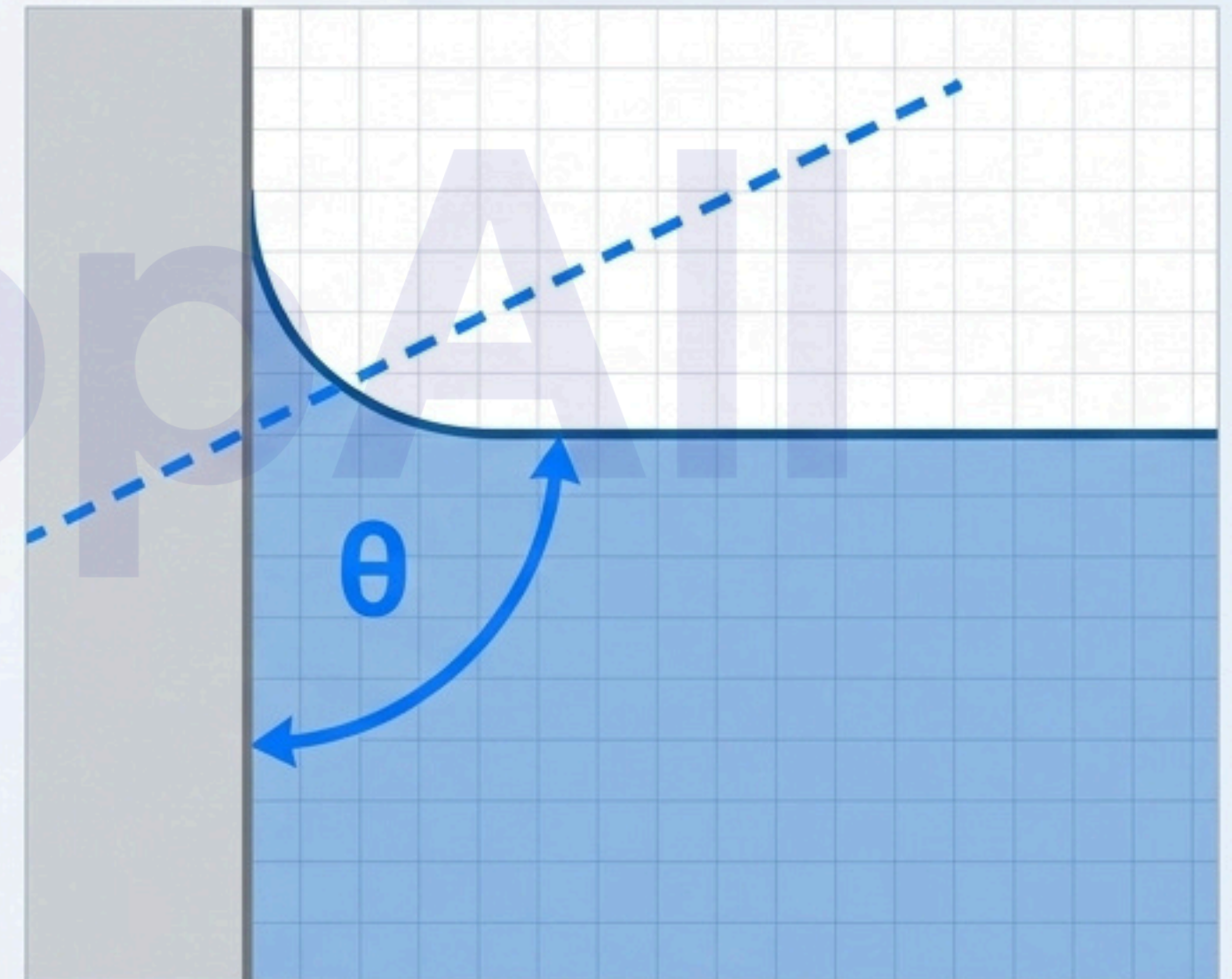


Defining the Angle of Contact (θ)

The angle between the tangent to the liquid surface at the point of contact and the solid surface inside the liquid.

- Always measured inside the liquid.
- Different for every specific liquid-solid pair.
- Determines the macroscopic shape of the liquid.

Meniscus Close-Up Visual





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$$E=mc^2$$



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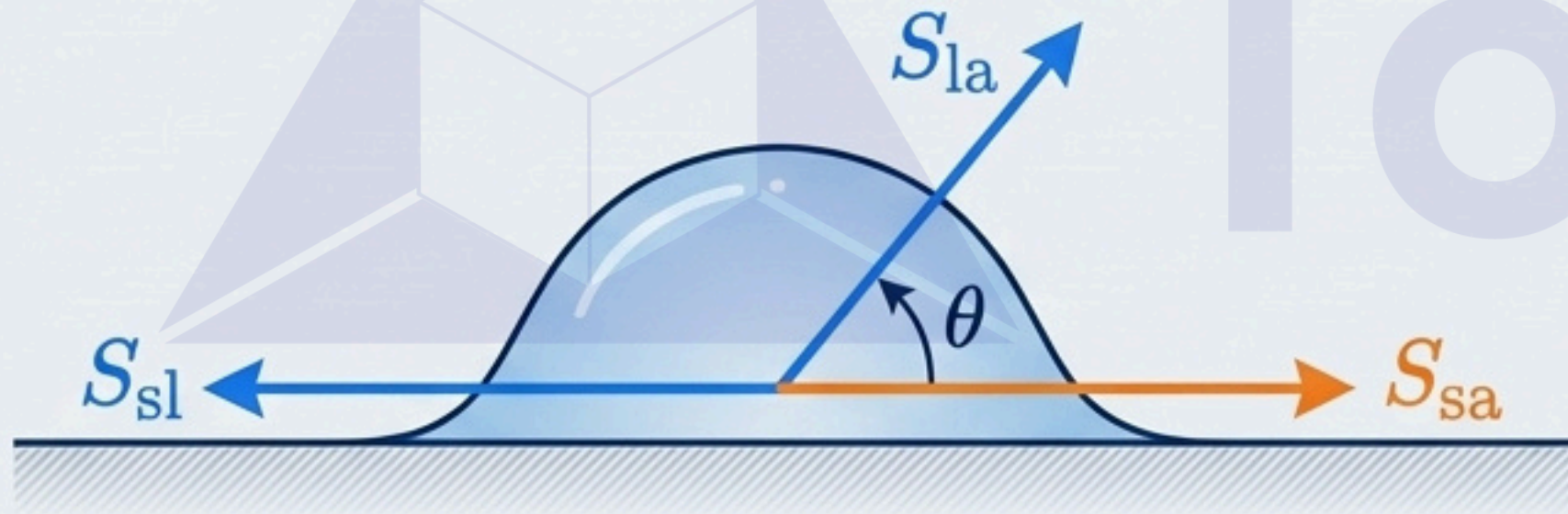
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The Physics of Equilibrium

At the line of contact, surface forces between the three media must be in perfect equilibrium.



S_{la} : Liquid-Air tension

S_{sa} : Solid-Air tension

S_{sl} : Solid-Liquid tension

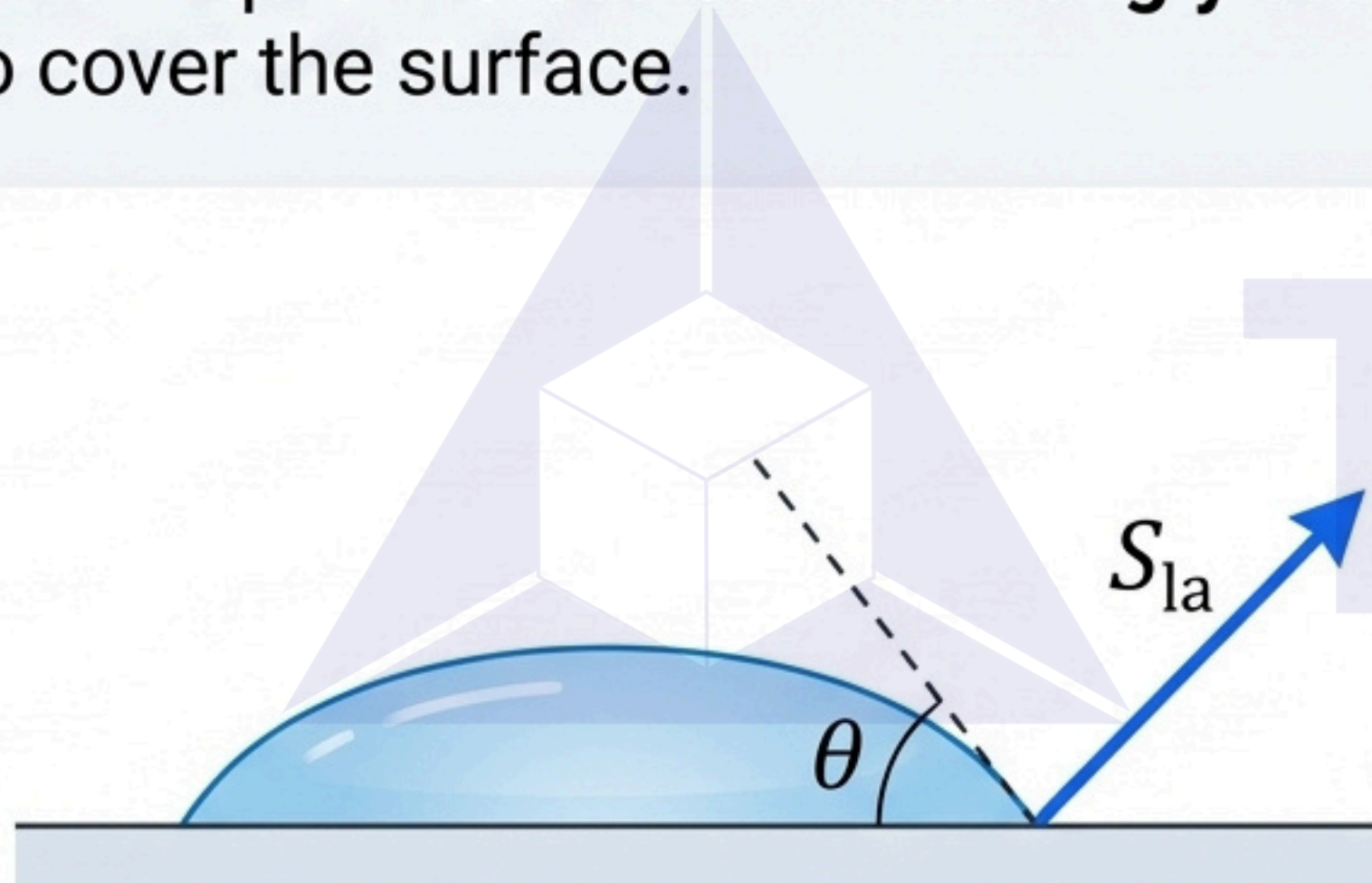
[FORMULA 9.22]

$$S_{la} \cos \theta + S_{sl} = S_{sa}$$

[FIG 9.17(b) REDRAW]

Wetting Liquids ($\theta < 90^\circ$)

When liquid molecules are **strongly attracted** to the solid, the liquid spreads out to cover the surface.



Key Conditions Card

Angle: Acute ($\theta < 90^\circ$)

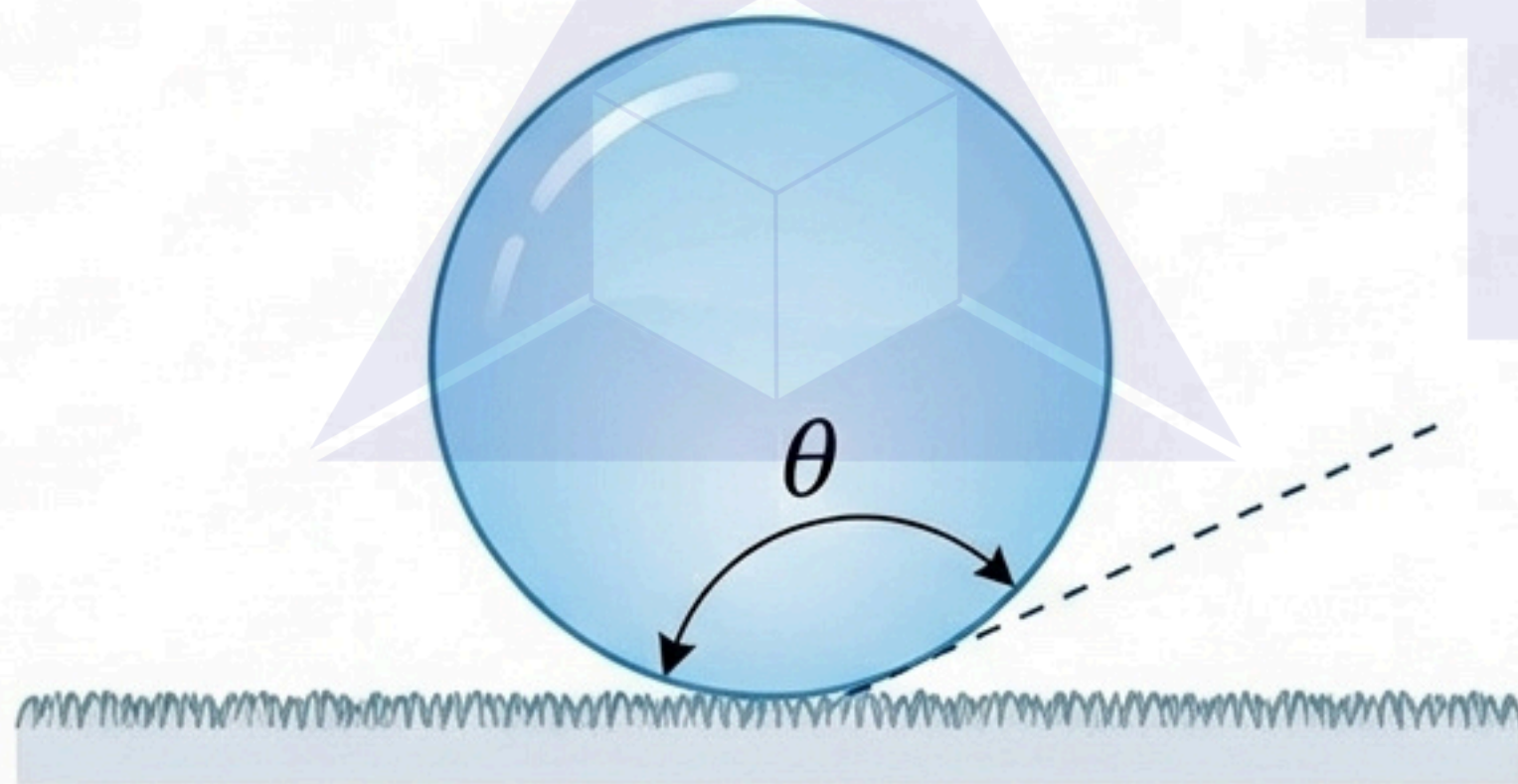
Tension: $S_{sl} < S_{la}$

Action: Liquid **WETS** the solid.

Examples: Water on clean glass,
Water on plastic, Kerosene on most
surfaces.

Non-Wetting Liquids ($\theta > 90^\circ$)

When liquid molecules are **strongly attracted** to themselves and weakly to the solid, it costs energy to create a liquid-solid interface.



Key Conditions Card

Angle: Obtuse ($\theta > 90^\circ$)

Tension: $S_{sl} > S_{la}$

Action: Liquid forms DROPLETS
(does not wet).

Examples: Water on a lotus leaf,
Water on a waxy surface, Mercury
on glass.

Key Takeaways

Feature	Wetting Liquids	Non-Wetting Liquids
Angle (θ)	Acute ($< 90^\circ$)	Obtuse ($> 90^\circ$)
Tension Rule	$S_{sl} < S_{la}$	$S_{sl} > S_{la}$
Physical Shape	Spreads / Flattens	Forms Spherical Droplets
Classic Example	Water on clean plastic	Water on lotus leaf

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