BOULDER SUMMER SCHOOL LECTURE: WETTING AND CAPILLARITY

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(As you can see, my aim is to save some paper.)

I. WETTING & ROUGHNESS
7/7/11

1. Drops shapes

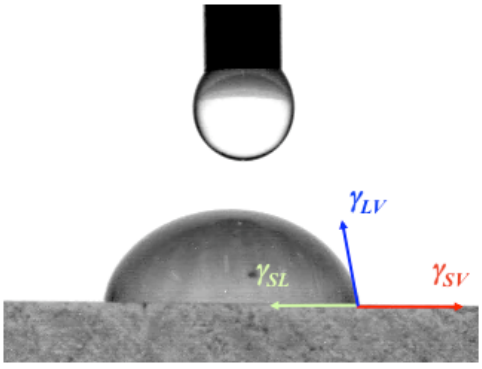
At small scale, surfaces are shaped by surface tension γ. This is a consequence of the existence of surface energy $E \sim \gamma\Sigma$. Hence we can also define a "special" force γL, and a "special" pressure γ/L.

Examples:

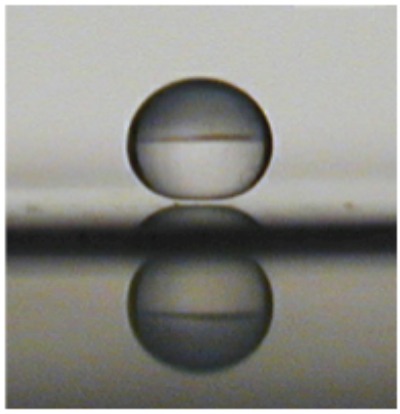
The shape of drops and bubbles.

The shape of raindrop (despite Laurette's statement, said at 11:23 on 7/7/11 in Boulder, CO: "Looking at something which we drop, that's stupid experiment")

Thomas Young's contact angle (shown below).

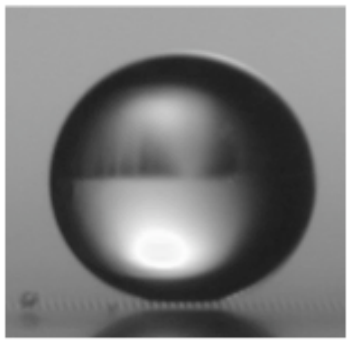


Leidenfrost effect.



Levitating liquid.

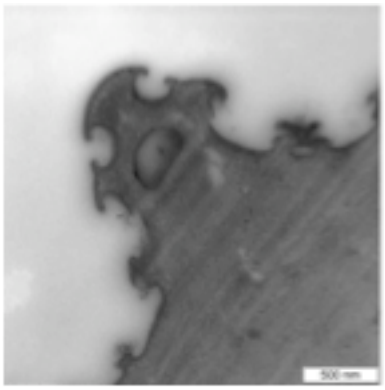
2. An illustration of these principles: liquid fakirs



A liquid fakir in action.

How they can resist impalement (discussion). Natural examples.

Consequence: super-oleophobicity. How man imitated nature without realizing it.

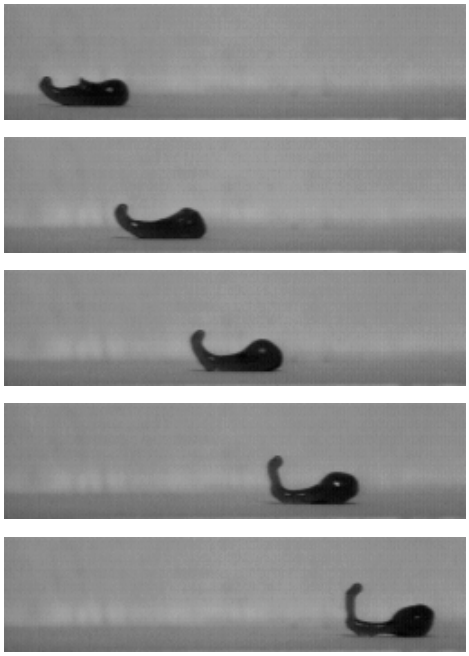


The delicate texture on Collembola skin.

3. Dynamical effects

The lotus effect.

Running drops, slow (most of often) or fast (a rare yet interesting case).

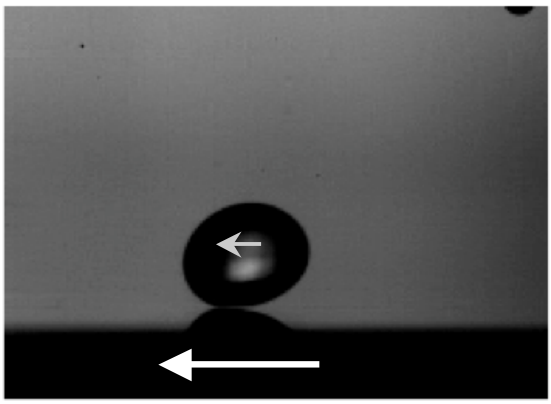


A drop that imitates a whale.

Slip at surfaces.

Bouncing drops: the liquid spring.

Dynamical Leidenfrost effect.



Liquid surfing on air.