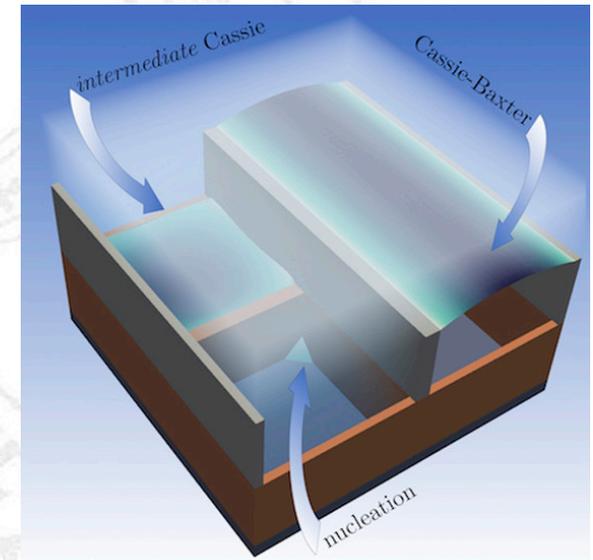
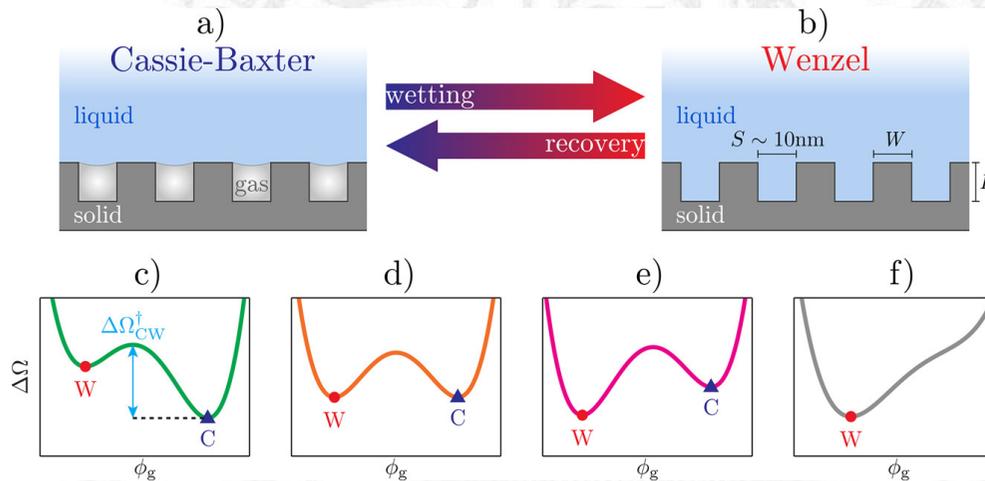


# Superhydrophobicity and evaporation in nano- and micro-textured surfaces

In this presentation recent theoretical and numerical results on the formation of vapor bubbles from liquids in hydrophobic confinement are exposed. A wealth of phenomena of fundamental, technological, and biological relevance rely on this surface-accelerated evaporation, including cavitation, superhydrophobicity, and protein folding/gating of ion channels. In particular, superhydrophobicity is a set of surface properties originating in the formation of gaseous pockets within surface roughness or textures, which include self-cleaning, drag reduction, and antifouling. Specialized "rare event" simulations, combined with molecular dynamics and continuum capillarity models, are used in order to compute the free-energy barriers connected with the transition from a superhydrophobic state to a fully wet one, where the technologically relevant properties are lost. Also the reverse, "recovery" transition is investigated, elucidating the conditions required to have perpetual superhydrophobicity [1,2]. The adopted approach allows us to relate the kinetic and mechanical stability of superhydrophobicity with the geometric and chemical characteristics of the solid surface opening the door to rational design of superhydrophobic surfaces [2]. Finally, the relevance of the concept of evaporation induced by confinement is discussed in other realms – biology and porous materials [3].

### References:

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**November 22<sup>nd</sup>, 10:00 am (sharp)**  
**DICAr MS1 Meeting Room**  
Via Ferrata, 3 – Pavia