

Wetting Phenomena on Structured Surfaces

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The morphology of wetting layers on structured or imprinted surfaces is determined by the geometry of the underlying surface domains. Droplets which cover a single domain exhibit contact angles which do not have to fulfill the classical Young equation. These droplets can show a new kind of instability characterized by rearrangement of the liquid within the droplet. For example, channels on hydrophilic stripes undergo a shape instability to a state with a single bulge when the liquid volume reaches a critical value. For surface patterns consisting of many surface domains, droplet patterns, the wetting layer exhibits several distinct morphologies (homogeneous droplet patterns, heterogeneous droplet patterns, film states) and undergo morphological transitions between these different states. The latter transitions exhibit spontaneous symmetry breaking.