

# Morphogénèse et Nanostructures

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*CNRS/Spectro, UJF-Grenoble.*

Eric Bonnetier

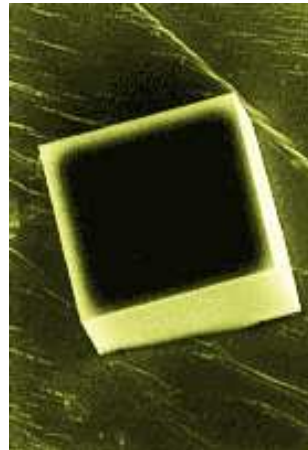
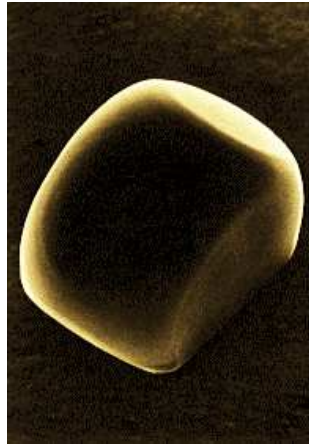
*LMC, IMAG, Grenoble.*

*2006*

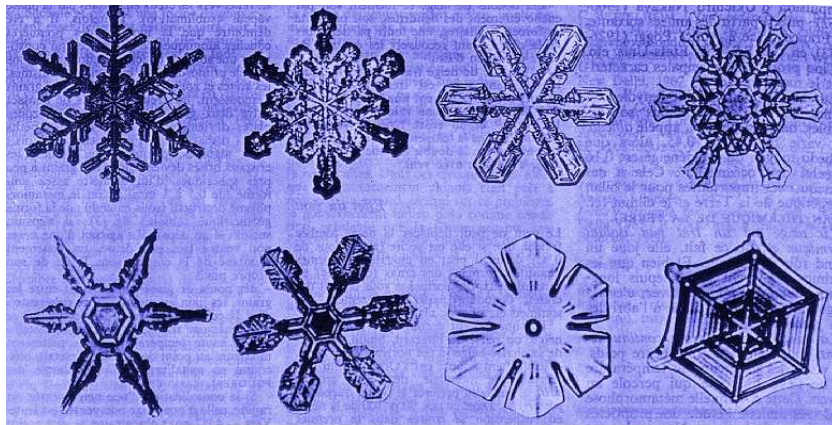
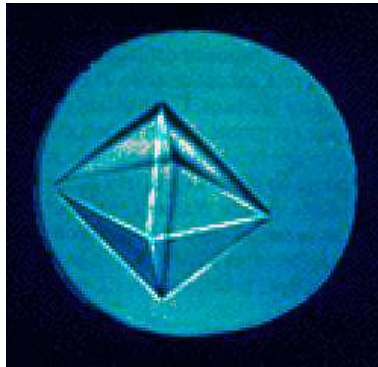
# Première Partie

## Formes d'équilibre et formes stationnaires

- Transition rugueuse et forme d'équilibre
- Modèle de Frank
- Clusters dérivants



NaCl Métois, CRMCN, Marseille



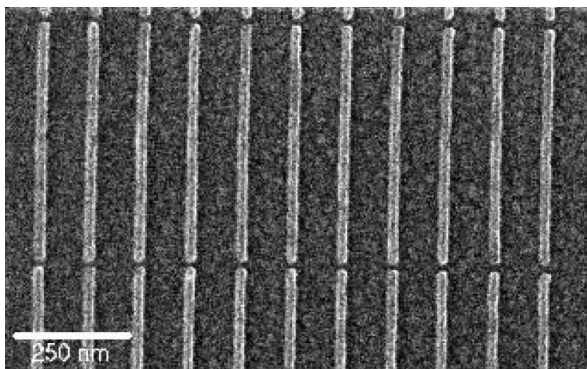
Y. Furukawa, Hokkaido Univ.

## Sculpter les surfaces?

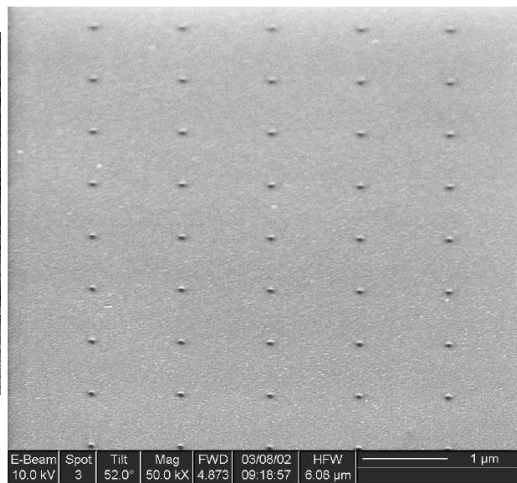


### Lithographies:

- électronique (polyméthacrylate de méthyle)
- ionique (Silicium)

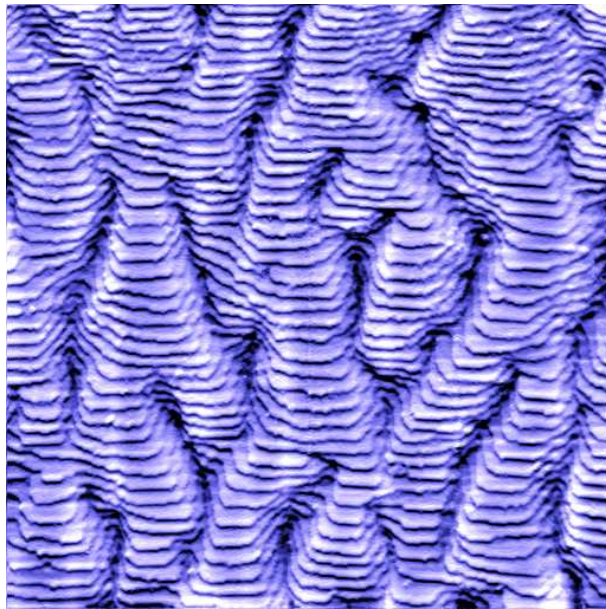
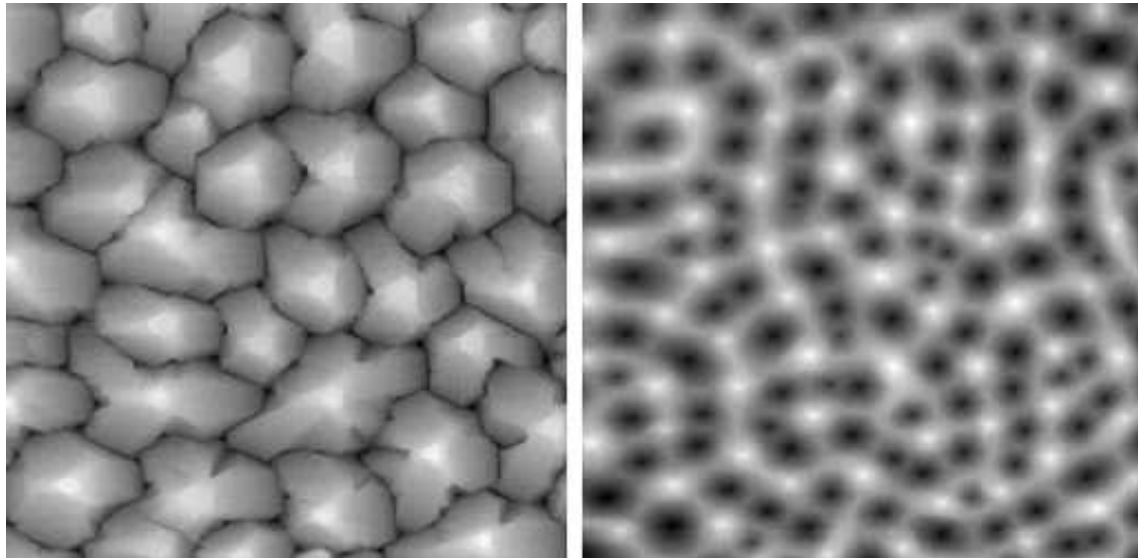


Hoole et al 1997



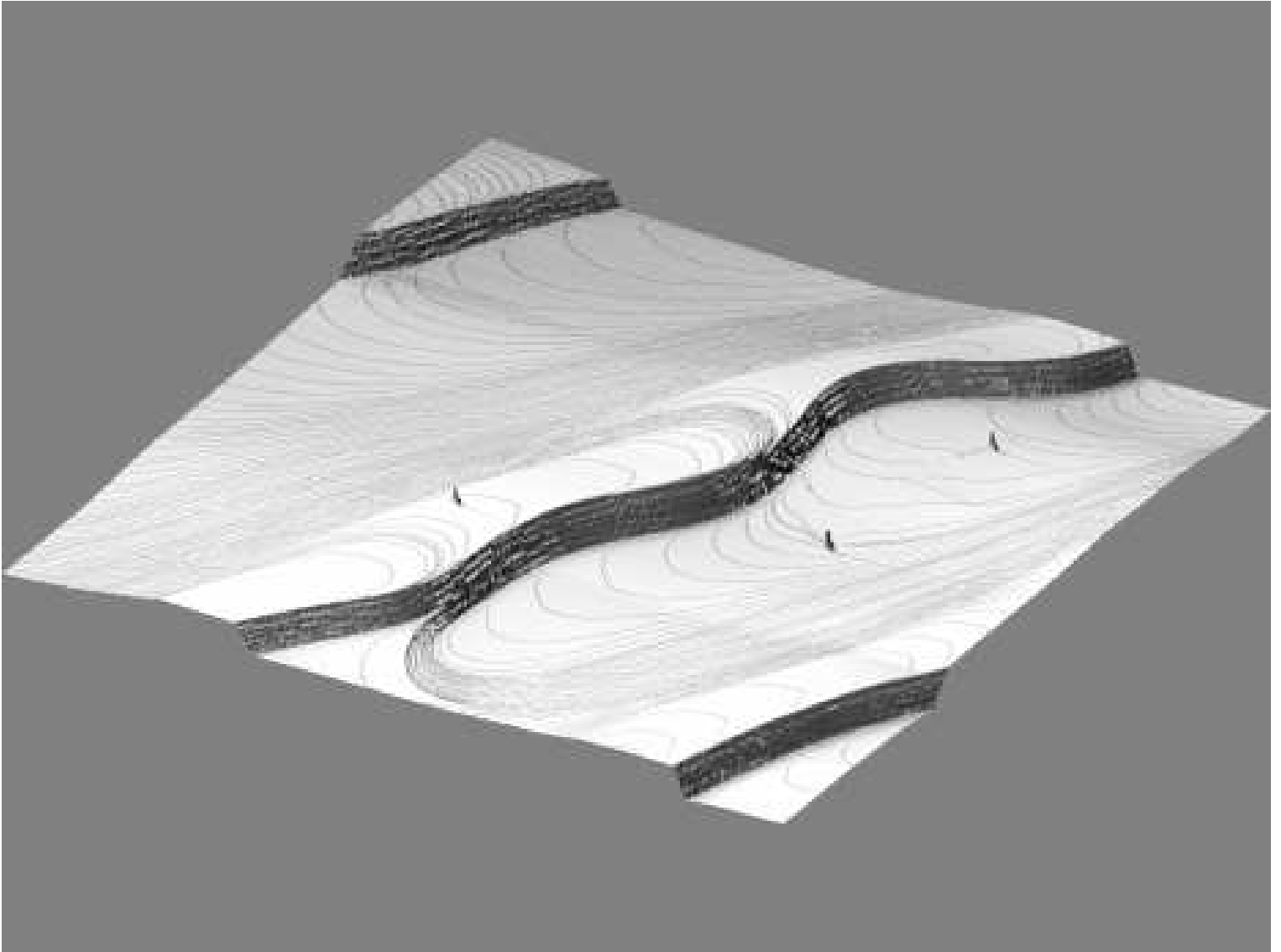
# Morphogénèse spontanée de nanostructures

## Croissance et bombardement ionique



haut: T. Michely, Aachen; bas L. Douillard, H.J. Ernst, Saclay

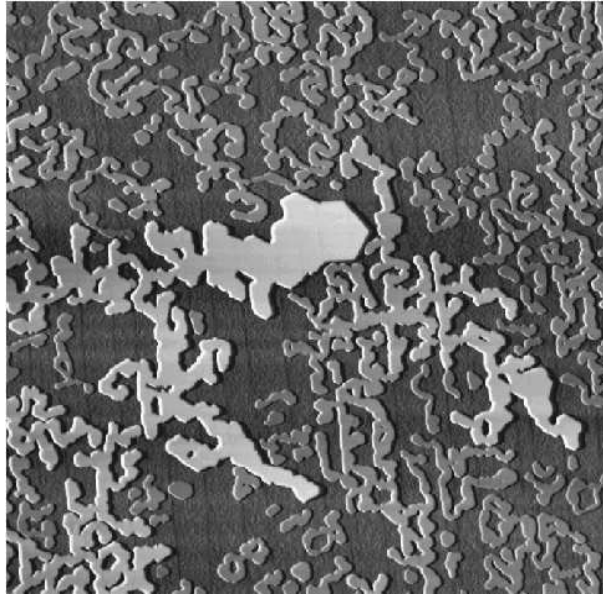
# Électromigration:



K. Thürmer, E.D. Williams, Maryland

Stabilité?

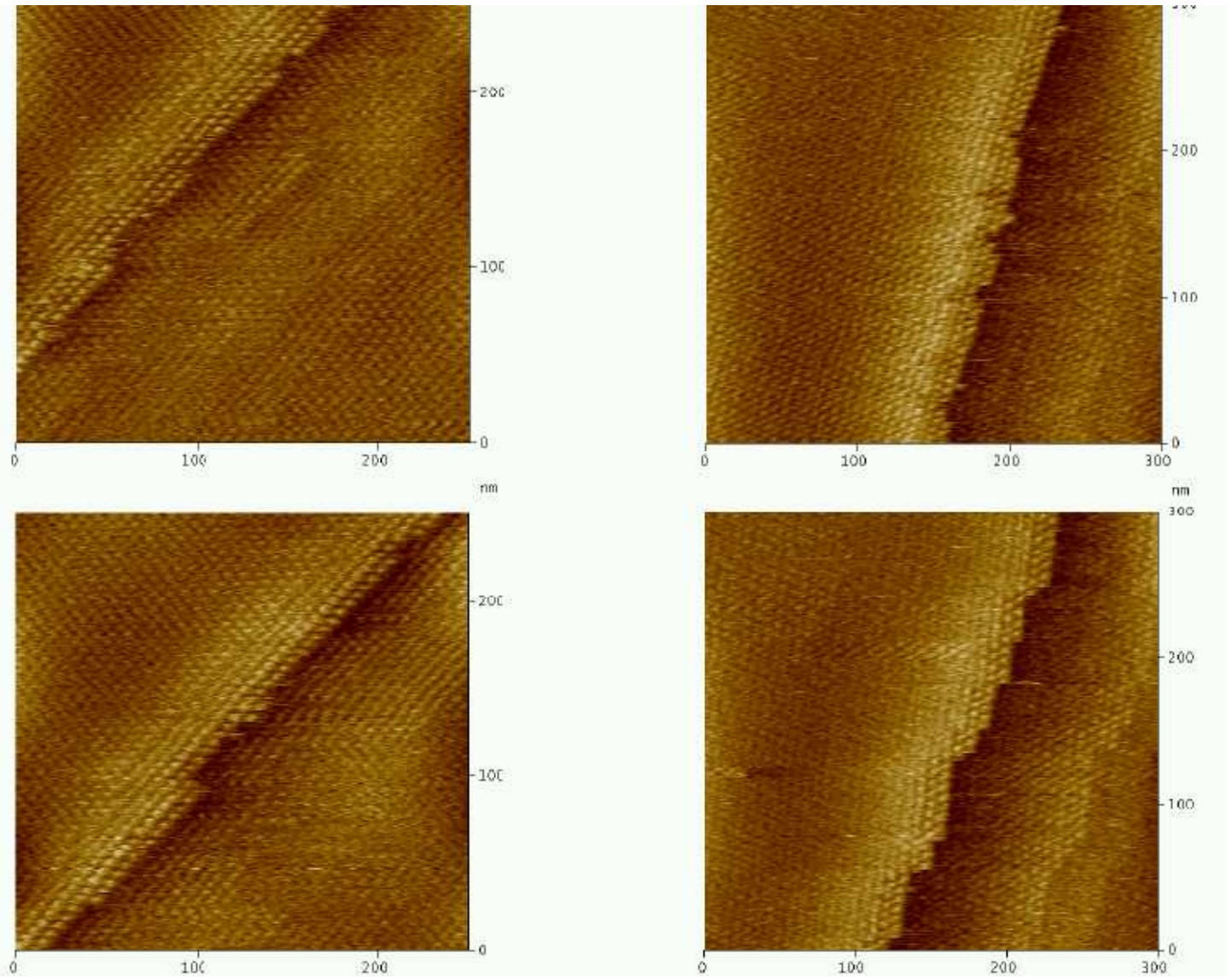
Démouillage des couches solides



K. Thürmer, E.D. Williams, Maryland

Relaxation de forme des nano-structures

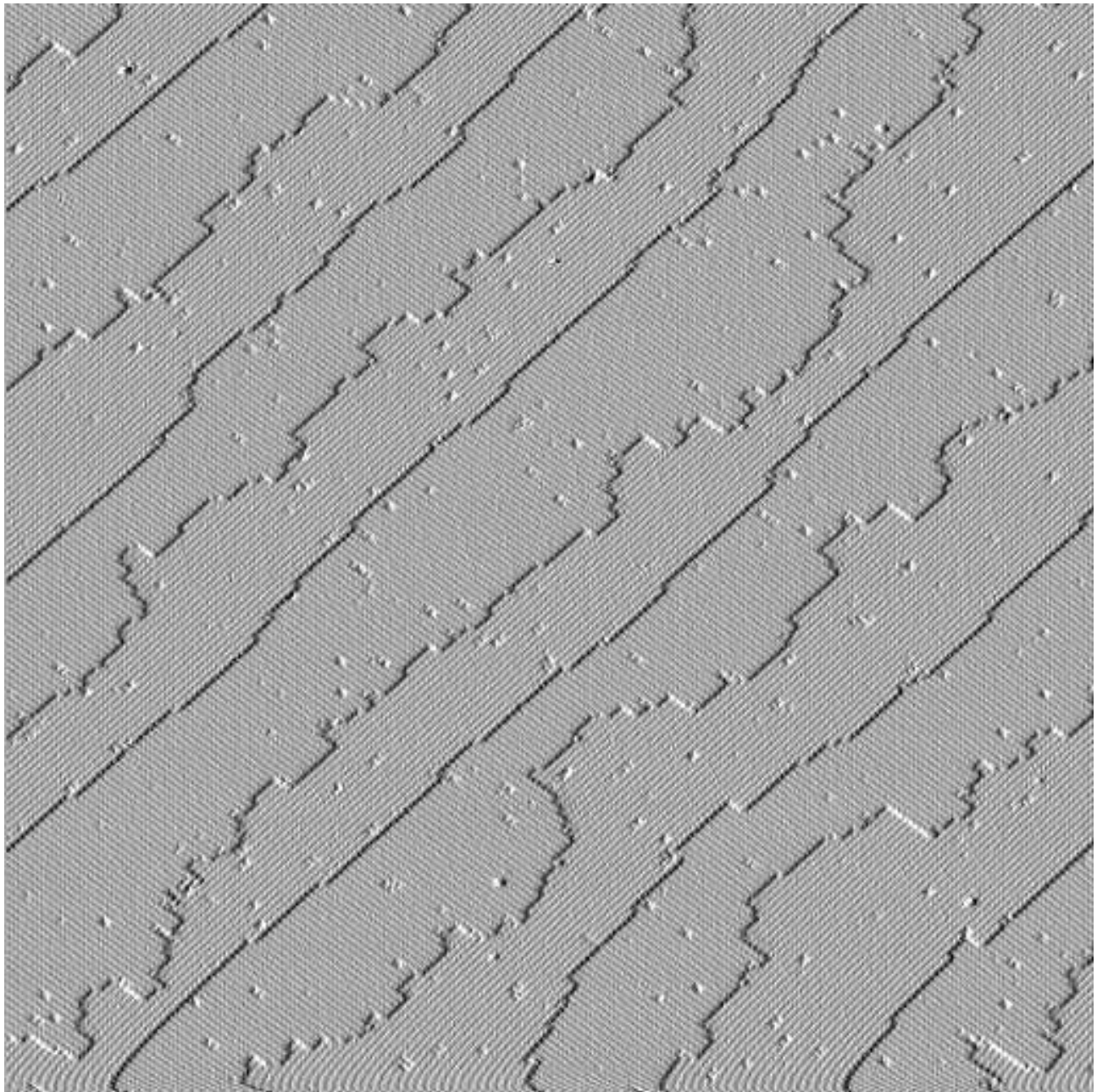
# Marches atomiques: Insuline



P. Vekilov, Houston

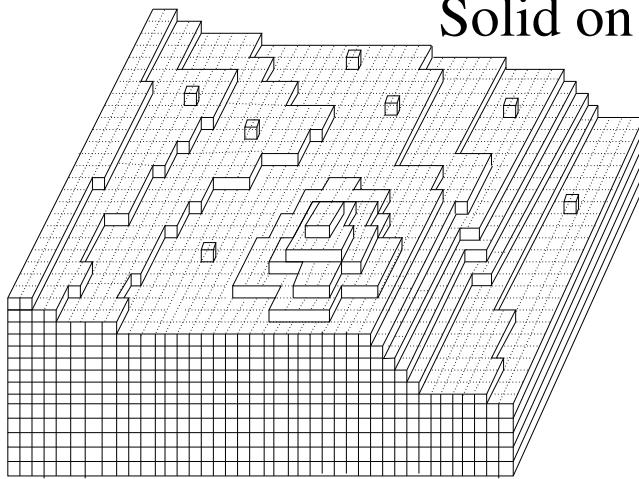


Si(100)

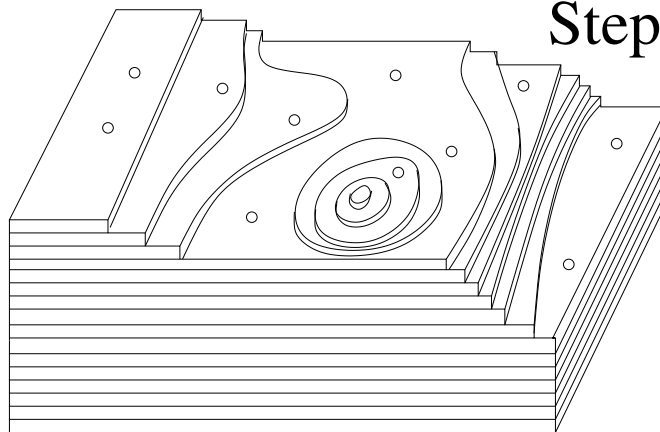


M. Lagally, Univ. Wisconsin

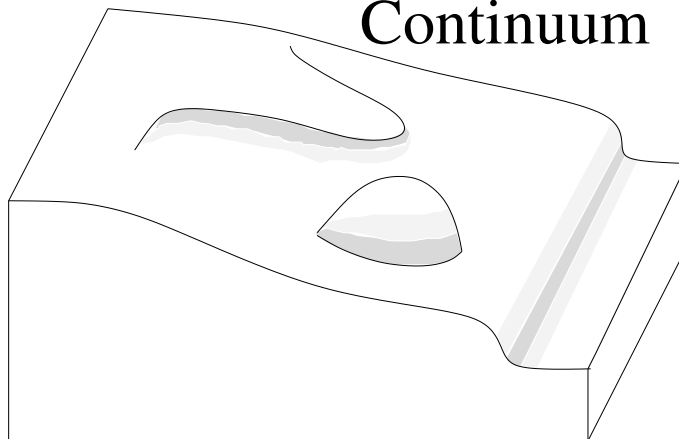
**Solid on Solid**



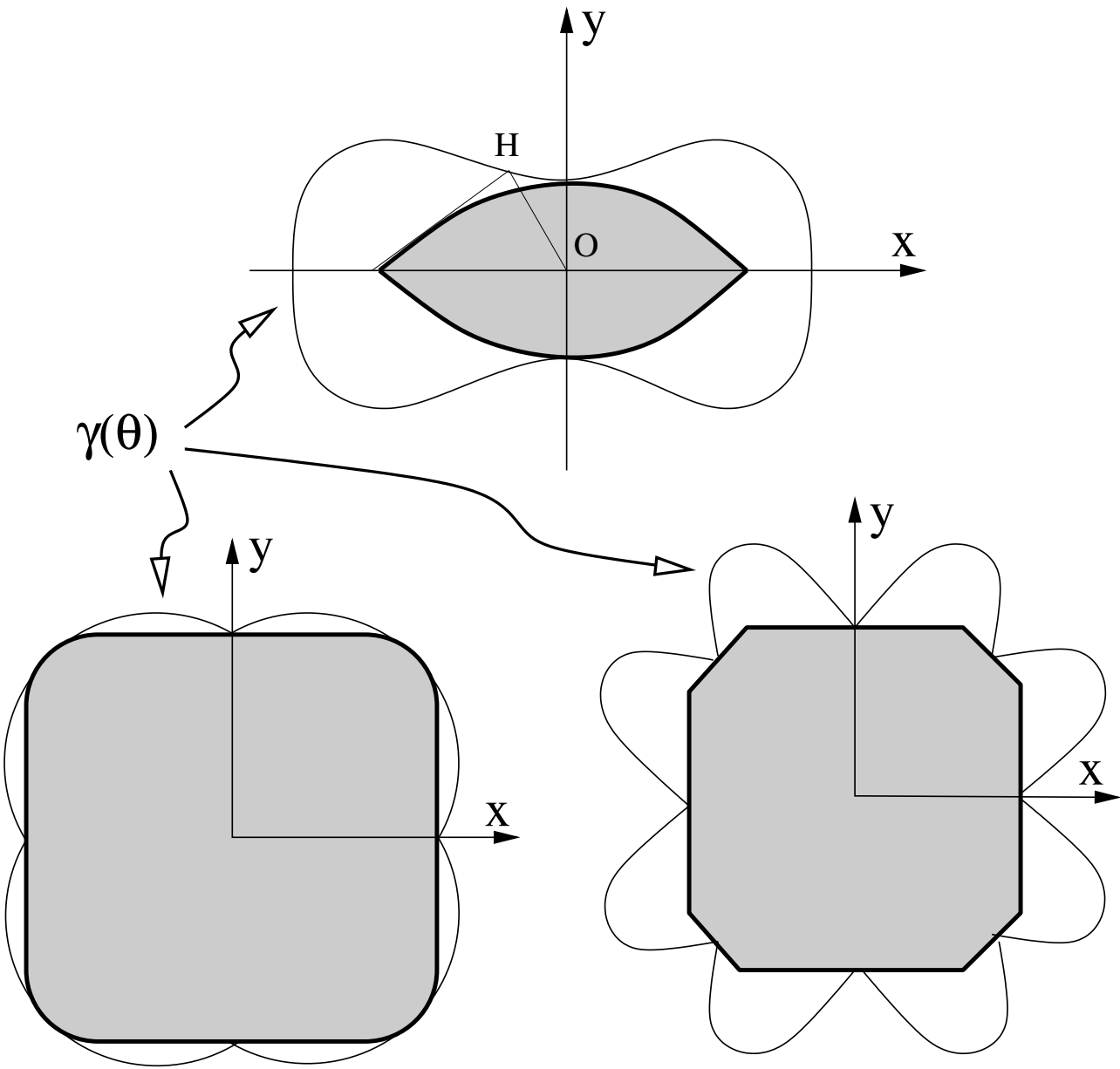
**Steps**



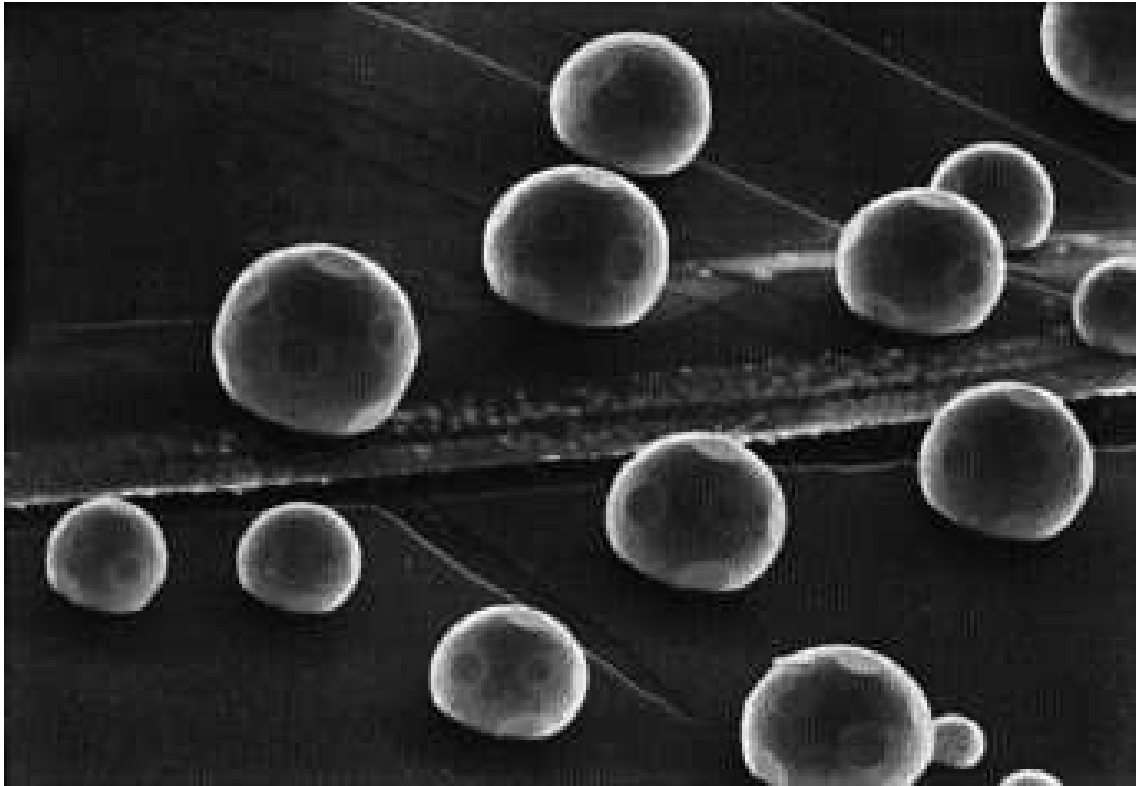
**Continuum**



# Construction de Wulff

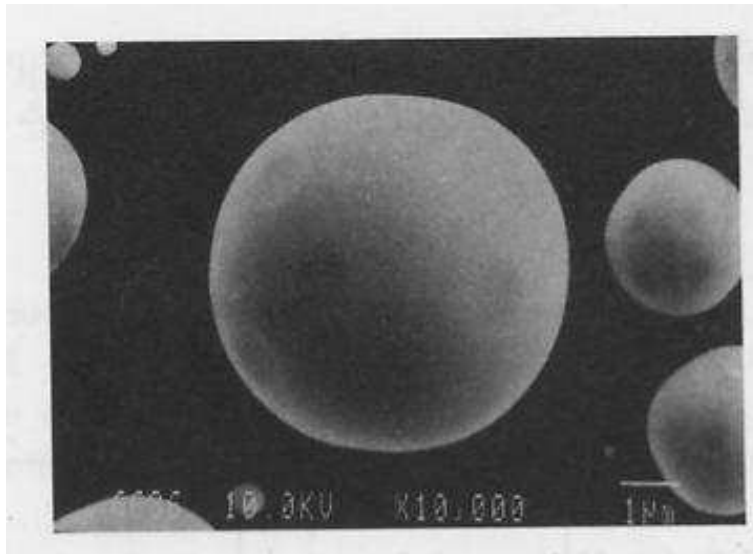


## Mouillage Au/Graphite

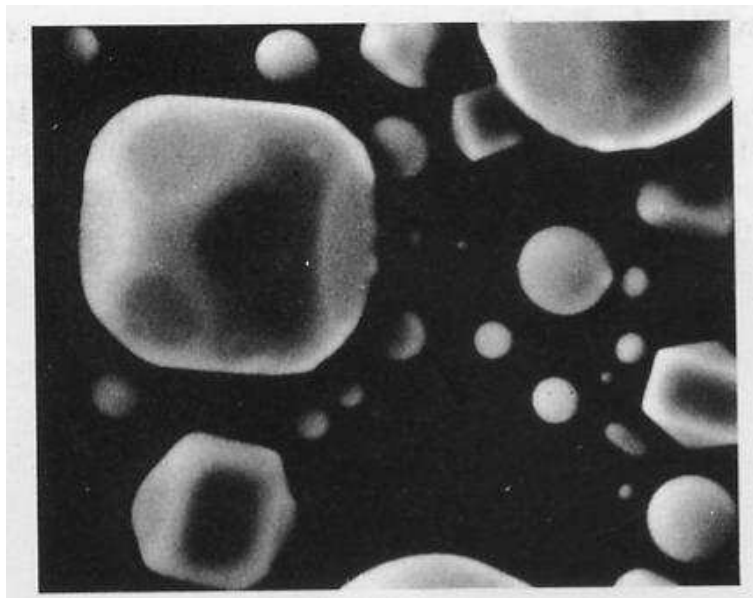


Heyraud, Métois, Marseille

Équilibre Sn 192°C ( $T_M - 40^\circ\text{C}$ )

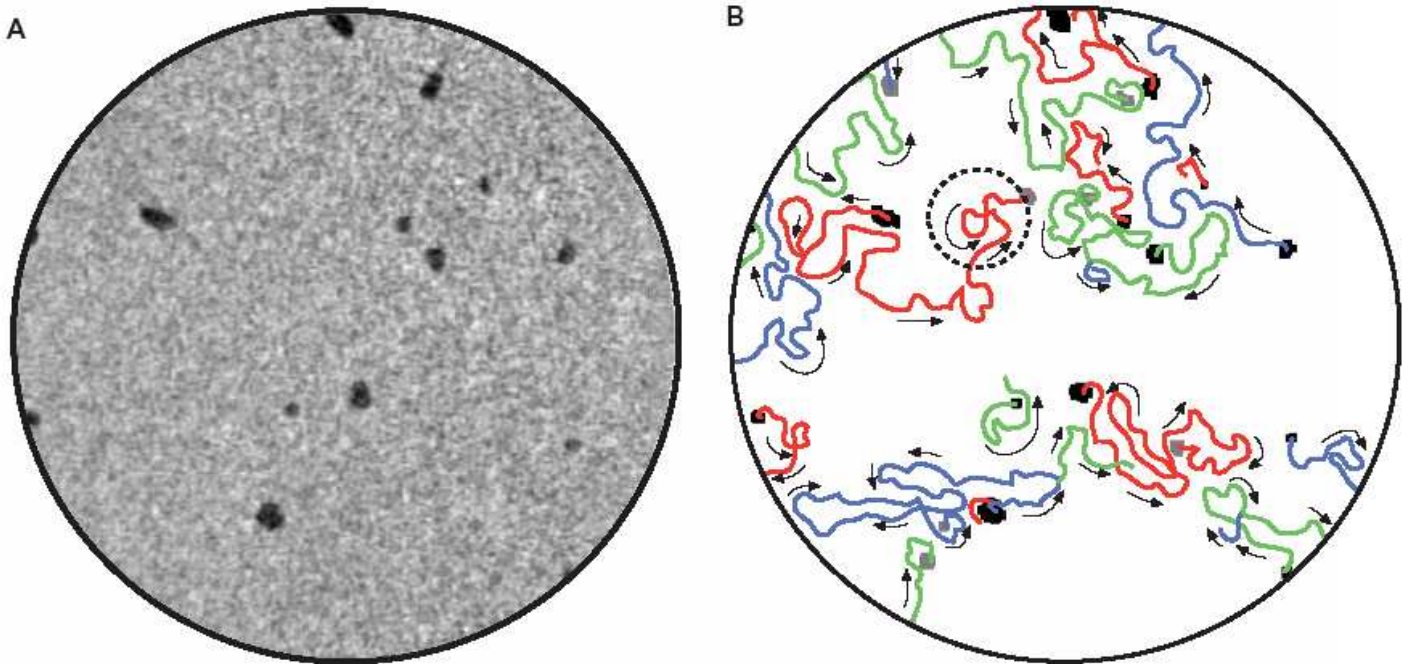


Croissance Sn 222°C ( $T_M - 10^\circ\text{C}$ )

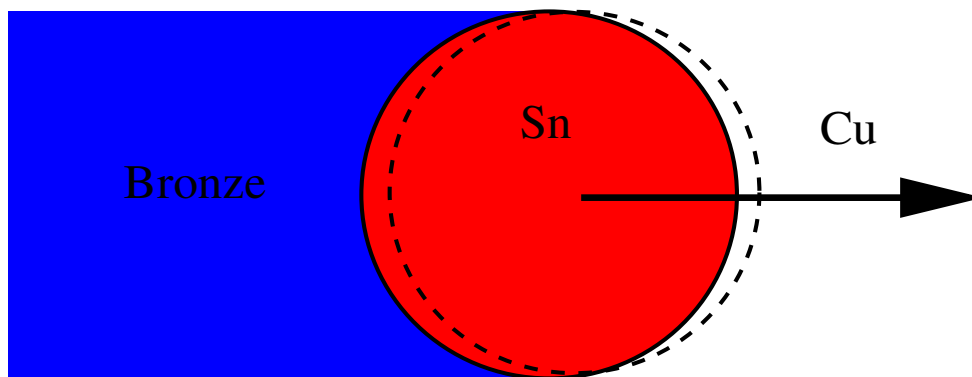


A. Pawlowska

# Mouvement de clusters de Sn/Cu(111)



LEEM,  $1.5\mu\text{m}$ , 290K



Schmid, Bartelt, Hwang, Science Reports (2000).