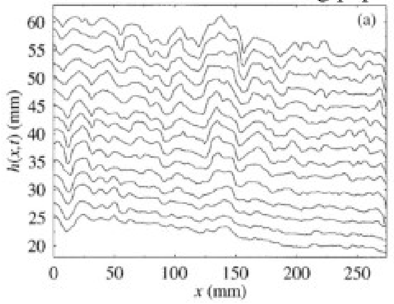
PHYSIKALISCHES KOLLOQUIUM

ANTRITTSVORLESUNG

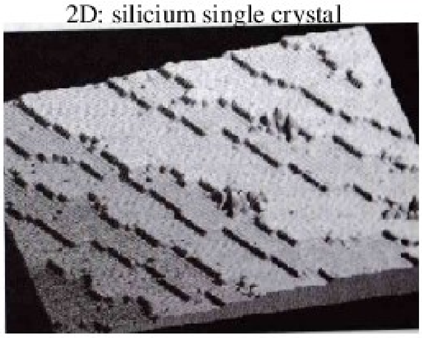
AM 26. JANUAR 2015 UM 17 UHR C.T.

IM GROẞEN HÖRSAAL

1D: tracked front of burning paper



2D: silicium single crystal



growing bacterial colonies

Question: smooth...

... or rough?

UNIVERSAL PROPERTIES OF GROWING INTERFACES

PD DR. FALKO ZIEBERT

PHYSIKALISCHES INSTITUT, UNIVERSITÄT FREIBURG

Many systems in Nature display growth processes, where one ‘phase’ grows at the cost of another ‘phase’. Examples span from the front of a slowly burning piece of paper, the imbibition front of a drop of ink, molecular beam epitaxy, where atoms are deposited on the surface of a crystal, the growth of bacterial colonies, the process of soil erosion, to much larger scales like the spreading of forest fires. A question of special interest, also for obvious practical purposes (cf. epitaxy), is whether the interface in a given system will be smooth or rough.

While the microscopic details of these processes are obviously very diverse, it has been found that on large scales such growing interfaces have universal properties, and that they can be described by stochastic partial differential equations like the famous Kardar-Parisi-Zhang equation. I will give an introduction to the general concepts used for the description of such growing interfaces, which share similarities to those used for classical bulk phase transitions.