CARL VON OSSIETZKY universität OLDENBURG
Institut für PHYSIK

PHYSIKALISCHES KOLLOQUIUM
EINLADUNG

03.07.2012/Ar

Am Montag, 09.07.2012, 16.15 Uhr in W2-1-148

spricht

Prof. Dr. Rainer Kree
Fakultät für Physik
Universität Göttingen

über

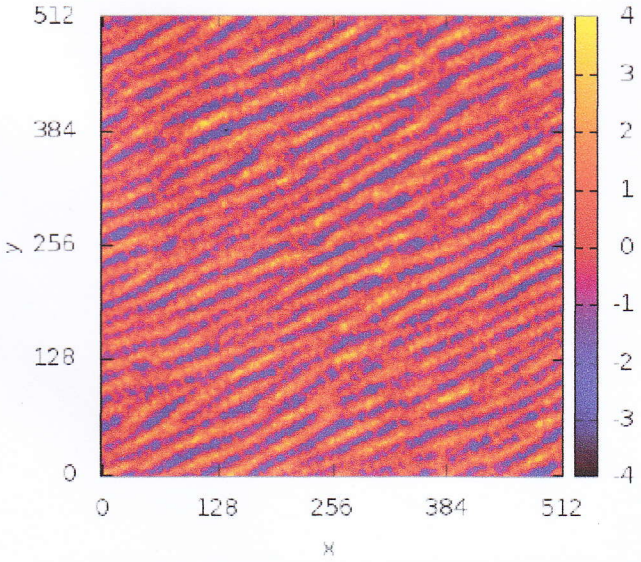
"Filigree with a sledge Hammer: Self-organized nanostructures from ion-beam irradiation"

A versatile process for the cheap mass production of nanostructures has become a decisive factor to drive future technologies. From a theorist's point of view, I will describe the approach of self-organized nanostructures induced by keV-ion-bombardment. This method emerged from an amusing chain of failures, pitfalls and misunderstandings. Against all odds, it has slowly reached a status, at which it may break even with other established methods in quality and outperform them by orders of magnitude in cost. It also teaches an important lesson about the interplay between fundamental and applied research.

It all started in 1956, when Navez failed to polish glass surfaces with an ion beam. Instead, he observed the appearance of irregular ripple-like structures. Theoretical explanations were given, and with the advent of nanoscience, several groups tried to improve the quality of the ripple structures without much success. More recently it turned out that the original explanation as well as the routes followed to improve structures were all based on fundamental misunderstandings of the physics of the underlying pattern forming processes. By chance, tremendous improvements in quality and diversity of ion-beam induced nanopatterns were discovered during the first decade of the millenium, —and again misinterpreted.

The most recent theoretical and experimental work reveals that we are just beginning to learn about the physics, which leads to self-organization of beautiful, highly regular nanostructures on semiconductors and metals under ion-beam irradiation. I will review and illustrate new ideas about this pattern formation from the point of view of our own theoretical approach , which combines Monte Carlo simulations and linear and weakly non-linear stability analysis of continuum models.

Einladender: Prof. Dr. Alexander Hartmann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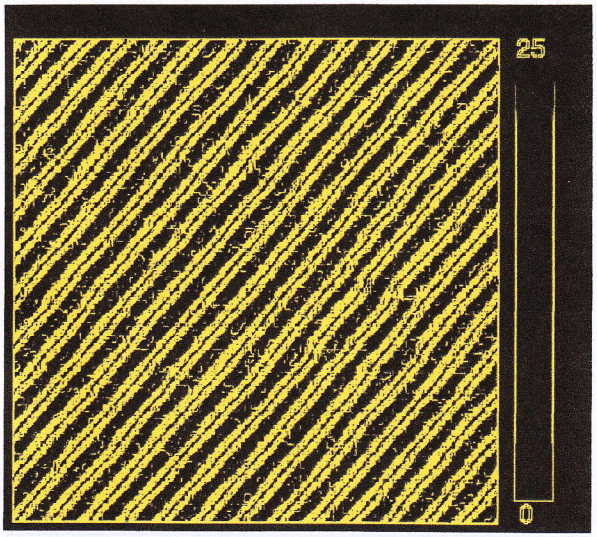
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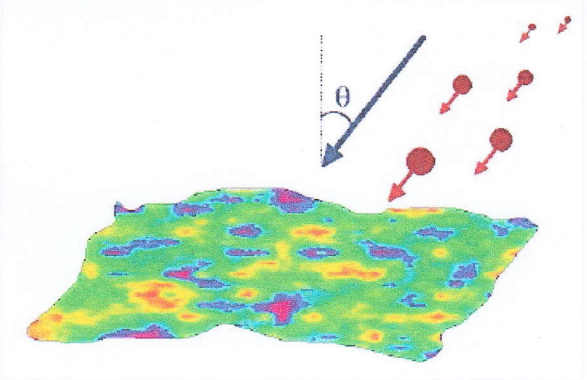
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