Einladung zum

WIENER PHYSIKALISCHEN KOLLOQUIUM

www.univie.ac.at/wpk

Slide Puzzles and Slipping Surfaces: Diffusion and Friction on the Atomic Scale

Joost Frenken

Kamerlingh Onnes Laboratory, Leiden University, The Netherlands

Usually, surface mobility is thought to be restricted completely to the steps and kinks on crystal surfaces. These sites form the natural locations for atoms to come and go. Atoms in the close-packed terraces are often considered to be completely static, since they are tightly packed by their neighbors. In this talk, measurements will be shown that have been obtained with the scanning tunneling microscope, which demonstrate that a close-packed terrace of a metal surface can be far from static, even at temperatures as low as room temperature! We make the motion visible of the atoms in a Cu(001) terrace, by embedding a low density of In atoms in the first Cu layer. The peculiar characteristics of the motion of the In show that the diffusion of surface vacancies is responsible for a continual reshuffling of all the (In and Cu) atoms in the first layer [1].

The possibility of surfaces sliding over each other without friction presents an exciting prospect, which has been proposed recently. High-resolution measurements will be presented of friction forces on graphite surfaces, obtained with a novel atomic force microscope. The results demonstrate the occurrence of the phenomenon of "superlubricity": the complete disappearance of friction between incommensurate surfaces.

[1] R. van Gastel et al., Nature 408 (2000) 665; Phys.Rev.Lett. 86 (2001) 1562.

Montag, 9. Dezember 2002, 17:30 Uhr
(ab 17:00 Uhr Kaffee)
Großer Hörsaal des Instituts für Experimentalphysik der Universität Wien
Strudlhofgasse 4/1. Stock, A-1090 Wien

Universität Wien ÖPG TU Wien

Unterstützt vom Kulturamt der Stadt Wien