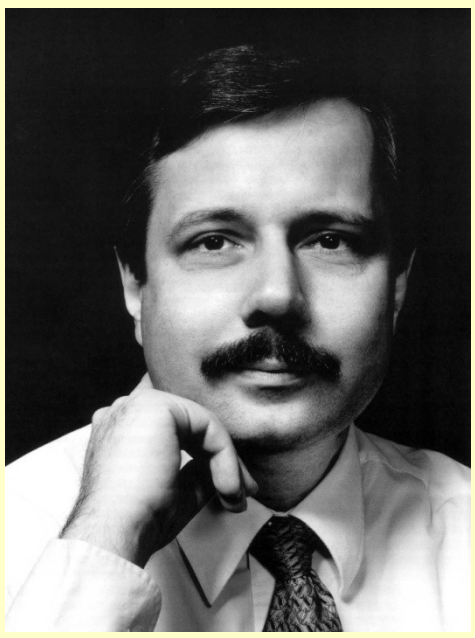
ZERNIKE INSTITUTE COLLOQUIUM

Thursday, November 3rd, 2011

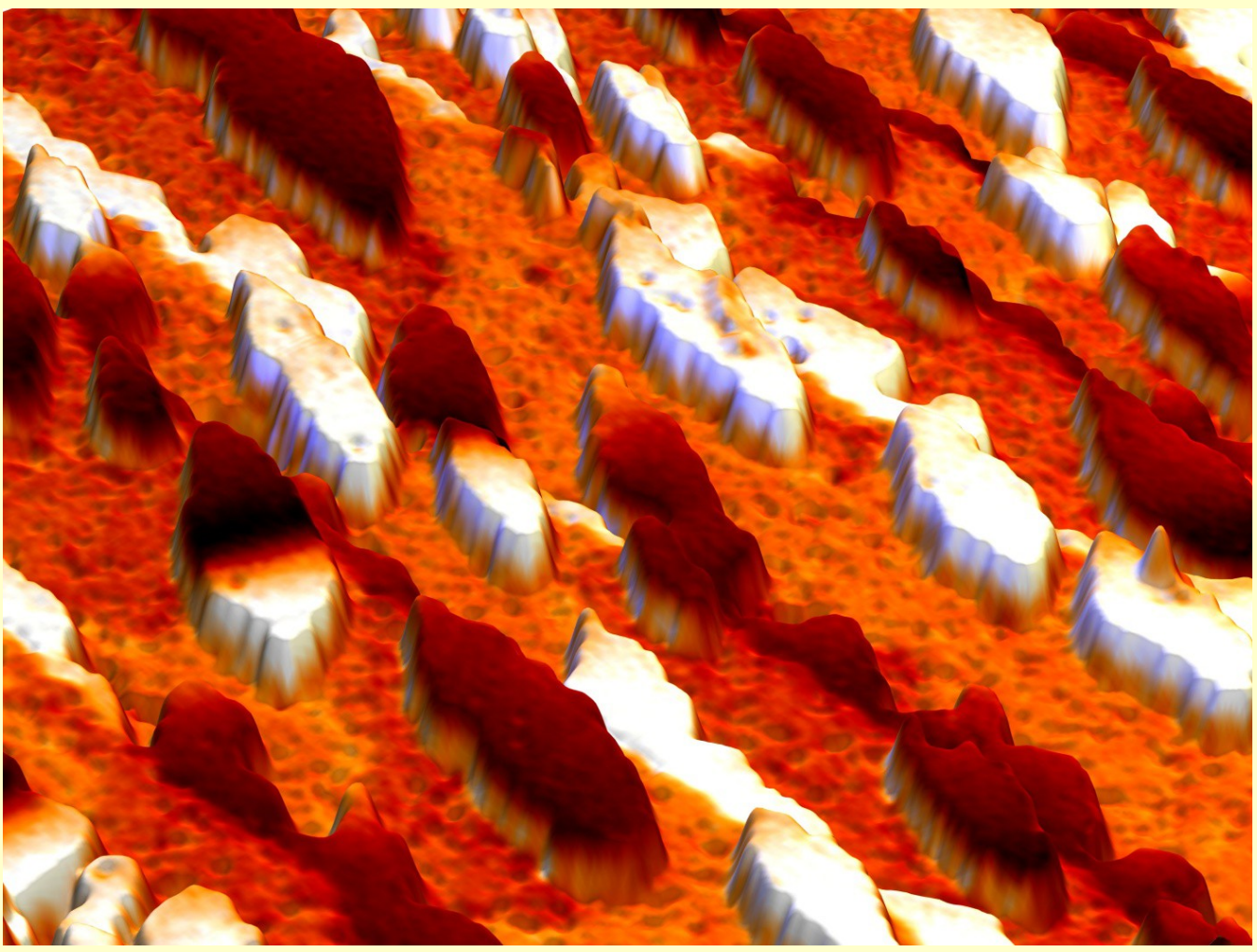
16:00h, Lecture Hall: 5111.0080 **Coffee and cakes from 15:30h**

Atomic Spin Logic Devices

Roland Wiesendanger
Institute of Applied Physics and
Interdisciplinary Nanoscience Center Hamburg
University of Hamburg
Hamburg, Germany



Spin-Polarized Scanning Tunneling Microscopy (SP-STM) provides new insight into spin structures at a length scale and a sensitivity level which are inaccessible by other magnetic-sensitive measurement techniques. The combination of atomic resolution in direct space, single spin sensitivity, and high energy resolution nowadays offers unique possibilities for probing spin-dependent states and interactions in natural or artificially created nanostructures. Moreover, spin-state manipulation based on spin-current induced switching and spin-state read-out by SP-STM methods offers another novel exciting research direction. Ultimately, a new type of magnetic recording technology might be developed based on spin-state writing and read-out rather than using magnetic stray fields. While the detection of magnetic stray fields becomes and more and more difficult as the magnetic bit size is further reduced, the concept of spin manipulation and spin-state determination has already been demonstrated down to the atomic level using SP-STM based techniques. Moreover, the recent demonstration of atomic-scale spin logic devices based on the combination of atomic manipulation and spin-sensitive read-out by SP-STM offers great potential for future information technologies using spins rather than charges for computation and information transmission at the atomic level.



Nano-scale magnetic Fe-islands grown on a stepped W(110) surface. The magnetization directions are color coded and have been determined by spin-polarized STM.

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