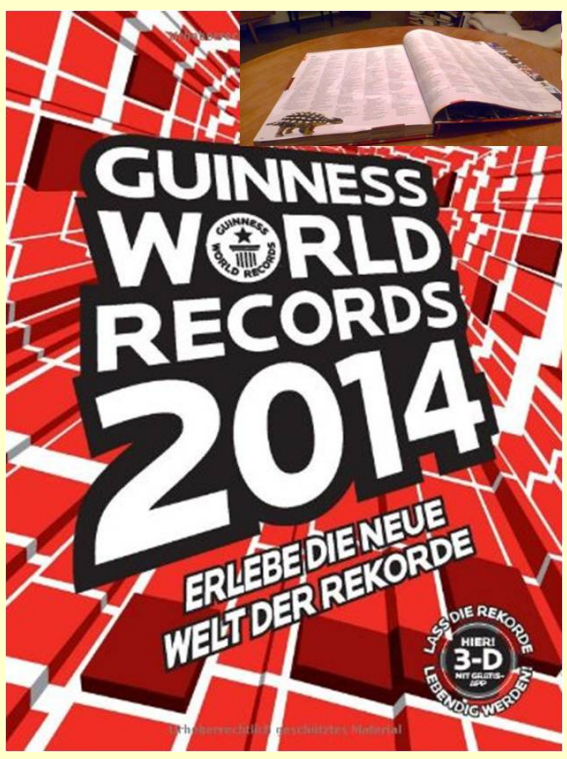
ZERNIKE INSTITUTE COLLOQUIUM

Thursday, February 4th, 2016

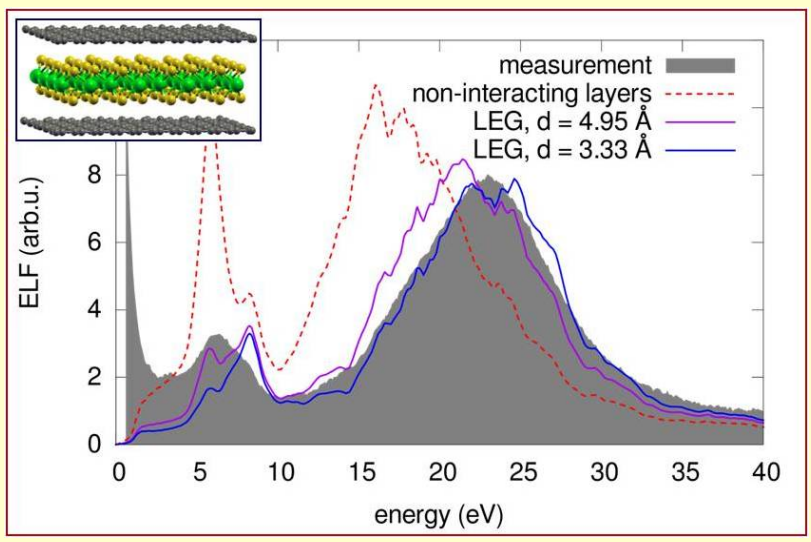
16:00h, Lecture Hall: 5111.0080 **Coffee and cakes from 15:30h**

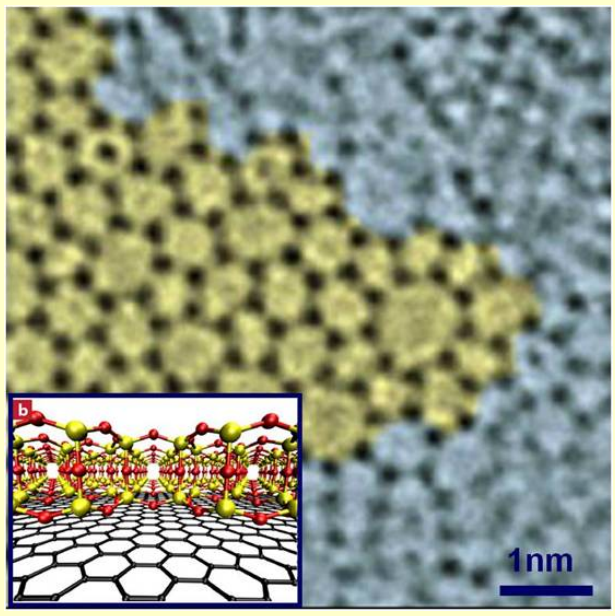
Electron optics — the gate to the nano-cosmos

Ute Kaiser
Group of Electron Microscopy
of Materials Science
University of Ulm
Ulm, Germany



In the Guinness book of records 2014 you find the entry about the discovery of the thinnest glass in an transmission electron microscope. It is exactly three atoms thick, the positions of the atoms are known as well as the nature of the single atoms. Such unprecedented accuracy has formerly been impossible. Still in 1959, Richard Feynman complained that electron microscopes are 100 times too bad in resolution compared to the diffraction limit. But what enabled such development? What opens the gate to the nano-cosmos? Did transmission electron microscopes become glasses? In fact, today these microscopes wear "glasses". Such electron optical components we call aberration-correctors in science. Correction of the spherical aberration inherent in electron lenses is nowadays already standard in many microscopes. Correction of the remaining chromatic aberration is now realised for our brand new low-voltage electron microscope. In this talk I will considers the benefits offered by chromatic aberration correction and show very first results opening new avenues for characterization of even biological materials. I will further report on the characterization of low-dimensional materials using analytical and standard spherical aberration-corrected low-voltage high-resolution transmission electron microscopy. I will show the unique challenges of this approach and its unique new possibilities that are different from those of 3-D bulk structures. I will discuss some of these aspects on the example of nano-carbons such as the Nobel price material graphene, filled carbon nanotubes and nano-diamonds with potential applications in the field of nano-catalysis, drug-delivery, and ultrafiltration and on two-dimensional chalcogenides.





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