highlights of physics

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www.salve-project.de/home.html

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Sharper seeing with electrons

September 2016 - SALVE goes public at the „Highlights of Physics“, the annual physics festival in Germany organized by the DFG and the BMBF and themed „Microcosmos“. Professor Ute A. Kaiser outlined the SALVE-project to more than 400 visitors in Ulm‘s city hall“, and presented SALVE in the „Highlights Show“ moderated by Rangar Jogeschwar to more than 4000 interested inhabitants of the city Ulm. The festival took place from 27th September to 1st October 2016 in Ulm. The „Microcosmos“ started from the fundamentals of biophysical research with thematic excursions into the material sciences and medical physics, thus covered a wide range of measurement techniques and experimental methods - from high-resolution microscopy to current topics of quantum physics.

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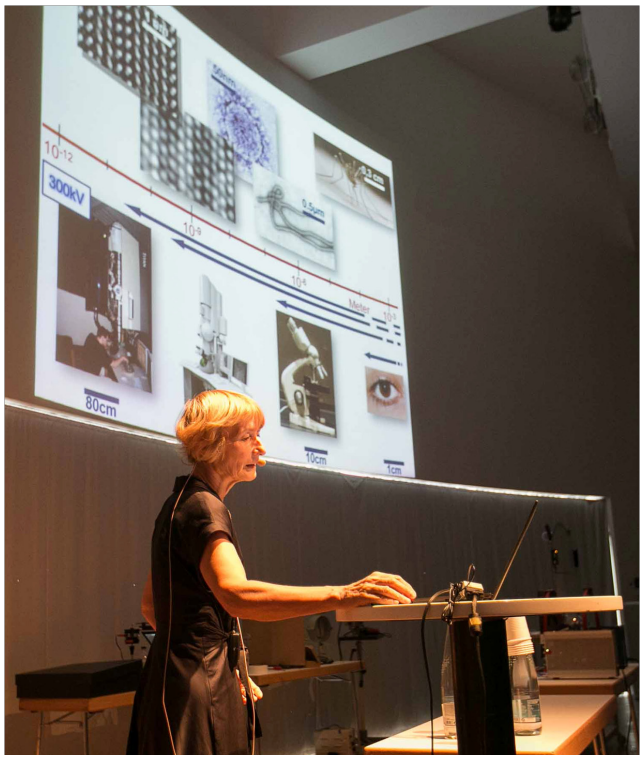

Only with the availability of special components: non-round lenses arranged in so-called „aberration correctors“, resolutions of single atoms and single atomic columns in materials could be achieved. The addition of an aberration corrector to an electron microscope has revolutionized the study of materials science. The exact detection and determination of the atom coordinates of defect sites in graphene or transition metal dichalcogenides (TMDs) with picometer accuracy is one example of the resolution that can be achieved with today‘s microscopes. There are also other limits in modern electron microscopy: apart from the electron-optical components, the radiation resistance of the objects determines the achievable resolution in the object‘s image. In this context, the University of Ulm has made a very important contribution with the SALVE project; On the one hand the radiation damage could be reduced by changing to very low voltages of down to 20 kV and a new world record with the resolution of 15 × λ at 40 keV was achieved. With the new ability to observe the precise atomic arrangement of electron radiation-sensitive materials, nanotechnology and biophysics have taken a major step forward.

In addition to the presentation of Professor Ute A. Kaiser, the visitors to the science week in Ulm were introduced by Michael Mohn, Tibor Lehnert, Pia Börrner and Manuel Mundzinger, PhD students from the Kaiser Group, to the history of aberration correction, to the state-of-the-art microscopy including the new SALVE microscope and to TEM sample preparation. In fact they could produce their own one-atom-thick graphene directly in a large-scale exhibition tent on the southern cathedral square in Ulm. This was a truely exciting experience to explain science to so highly interested people of Ulm.