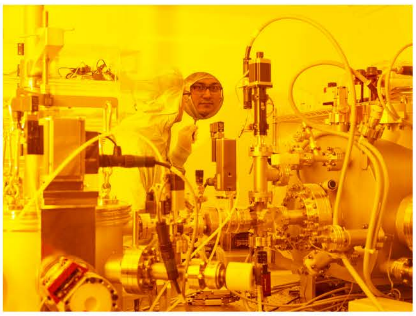
Research highlights

Seven nanometres for the electronics of the future



Researchers reveal how particularly fine structures can be produced in semiconductors for computer chips of the future

The production of increasingly more rapid and efficient computers and smartphones requires increasingly smaller components in the computer chips used, such as wiring or transistors. This poses a constant challenge for the technologies used to produce these components inside the chips. Scientists from the Paul Scherrer Institute (PSI) have now succeeded in reaching another important milestone here: they have created a regular pattern of parallel lines in a semiconductor material that are seven nanometres wide (one nanometre is a millionth of a millimetre) – equivalent to a component arrangement that is sixteen times denser than in today's chips. Industry envisages structures on this scale as the standard by the year 2028. The lines were created with EUV (extreme ultraviolet) light at the Paul Scherrer Institute's Swiss Light Source (SLS).
Read more on: http://www.psi.ch/media/seven-nanometres-for-the-electronics-of-the-future

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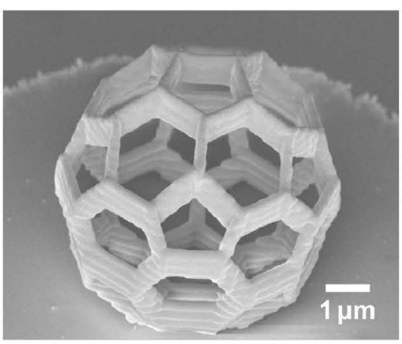
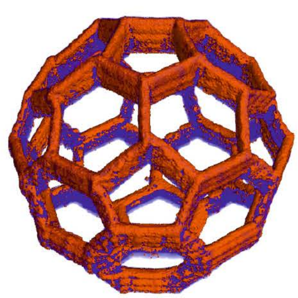
Nanometres in 3D





Claire Donnelly et al, Phys. Rev. Lett. 114, 115501 (2015);
DOI: 10.1103/PhysRevLett.114.115501

Scientists at the Paul Scherrer Institute and ETH Zurich (Switzerland) have created 3D images of tiny objects showing details down to 25 nanometers. In addition to the shape, the scientists determined how particular chemical elements were distributed in their sample and whether these elements were in a chemical compound or in their pure state.
The measurements were performed at the Swiss Light Source at the Paul Scherrer Institute using a method called phase tomography. The method was demonstrated using a football-like structure called a «buckyball», only 6 thousandths of a millimetre across, which was fabricated with the latest 3D laser technology. In addition to showing the shape of the object, the method allowed the scientists to pinpoint the locations of a specific chemical element (Cobalt) and deduce further information on the environment of its atoms. They made use of the fact that different elements interact differently with light of different energies, like different colours in visible light, allowing them to see the distribution of a specific element within the sample.
Being able to distinguish different elements and their compounds on the nanometre scale in three dimensions is highly relevant in the development of novel electronic and magnetic parts or more efficient catalysts for the chemical industry.