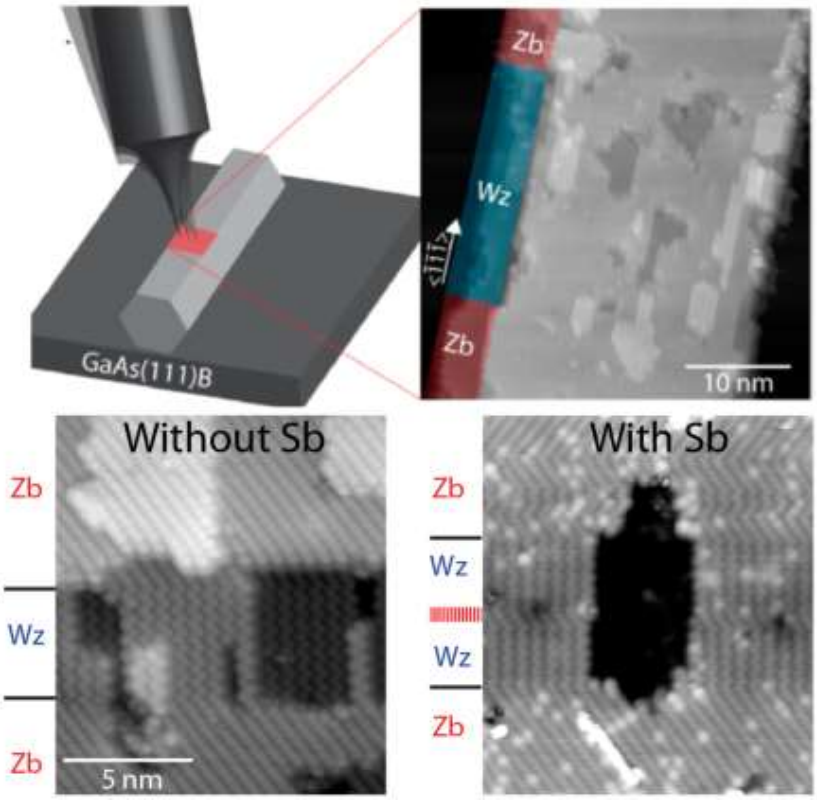

Method tags: Characterization/Experiment

Scientific tags: Materials science, Surface characterization/STM/AFM, Electronics, Synchrotron radiation/MAX IV

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https://portal.research.lu.se/sv/persons/rainer-timm

Rainer Timm's research focuses on the atomic-scale characterization of semiconductor nanostructures, especially III-V semiconductor nanowires, including analysis of the atomic surface structure, resulting local electronic properties, the chemical and structural composition of interfaces, and in-situ studies of such nanostructure properties during device operation.
With scanning probe techniques like scanning tunnelling microscopy and spectroscopy (STM/S) or conductive atomic force microscopy

(AFM), the atomic structure and resulting electronic properties of nanowire surfaces are investigated, including local effects at nanowire heterostructures consisting of different materials or crystal structure. Using advanced STM geometries, also the interior structure of nanowires or mechanical and transport properties of individual upright standing nanowires can be revealed. From AFM and STM/S studies on individually contacted nanowires, we explore the interplay between local surface structure and electrical device performance for nanowire devices like tunnel diodes or solar cells. As complementary technique he is using X-ray photoemission-based microscopy and spectroscopy at the MAX IV laboratory and other synchrotron facilities, for investigating the structure and chemical composition of surfaces and interfaces, e.g. doping profiles of individual nanowires or shallow interfaces of nanowire transistors with dielectric thin films. These techniques include X-ray Photoemission Spectroscopy (XPS) at ultrahigh vacuum or near-ambient conditions, nano-focus XPS, and X-ray diffraction.