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S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Di, 10.11.2015, 11:00 Uhr, Hörsaal für Physik

X-ray diffraction as local strain probe and for crystallography of semiconductor nanostructures

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Semiconductor nanowires exhibit a number of special properties making them interesting both for fundamental science as well as for different applications ranging from solar cells to fast transistors. In III-V semiconductors, the observation of hexagonal polytypes has spurred investigations of this crystal structure, which cannot be fabricated in bulk (at least not stable under ambient conditions). Some materials show a change in band alignment from indirect to direct fundamental band gap, such a behavior has also been predicted in the SiGe system. In this seminar, we will present the structural investigation of hexagonal Si material fabricated in nanowires, using high resolution x-ray diffraction.
Beside crysal structure, strain fields have important influence on the band alignment, hence strain measurement is an important task. We will discuss recent experiments comparing local strain analysis using x-ray diffraction and µ-Raman scattering, in order to calibrate strain-shift coefficients in the tensile strain region in the SiGe system.

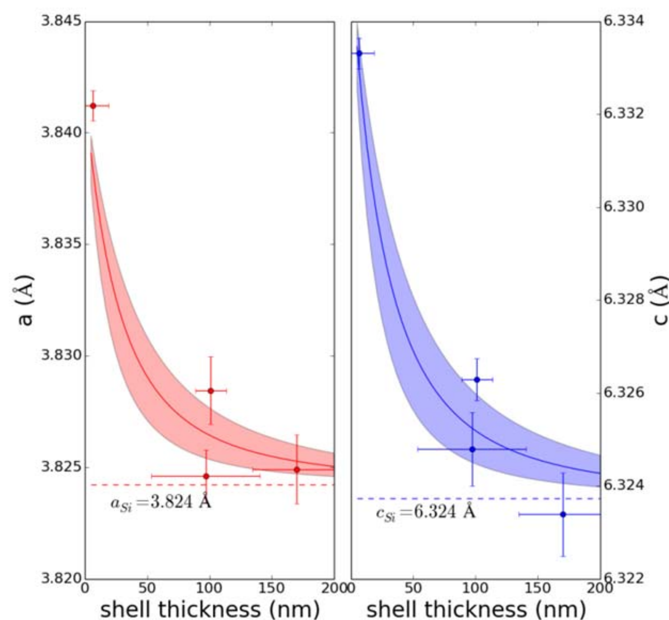

Figure 1: Average lattice parameter of a hexagonal GaP/Si core/shell system.