



Seminarankündigung

Montag, 3. Dezember 2018

15:00 Uhr

ZNN, Seminarraum EG 0.001

“Photoluminescence and electric transport of chemically prepared nanowires and nanosheets”

Semiconductor nanostructures such as 1D-nanowires or 2D-nanosheets can be prepared by wet chemical methods. They show unique physical properties depending on their diameter or thickness variation in a range of just a few nanometers. Therefore, many physical properties are hidden by the inherent size distribution and can only be explored by combinations of different microscopic and spectroscopic techniques, to investigate individual nanostructures.

As a first example, we focus on confocal fluorescence spectroscopy of single CdSe nanowires with a diameter less than 10 nm. In combination with TEM studies on the same wires, we establish a detailed structure-property relationship. Using low-temperature confocal PL spectroscopy we investigate the diameter dependent optical band gap and PL-dynamics, to attribute different spectral features to several recombination pathways within the nanowires. The second example are electrically contacted CdS nanowires, where we investigate the process of local photo conductivity through a combination of Scanning Photo Current Microscopy (SPCM) and Kelvin Probe Force Microscopy (KPFM). Here we measure the band bending along the contacted NWs, with and without local illumination, and compare the data with theoretical simulations. Finally, we present results on the electrical properties of individual hexagonal SnS-nanosheets. Here we show that X-ray microscopy and spectroscopy allows for multi modal imaging techniques, with element sensitivity and high lateral resolution.

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