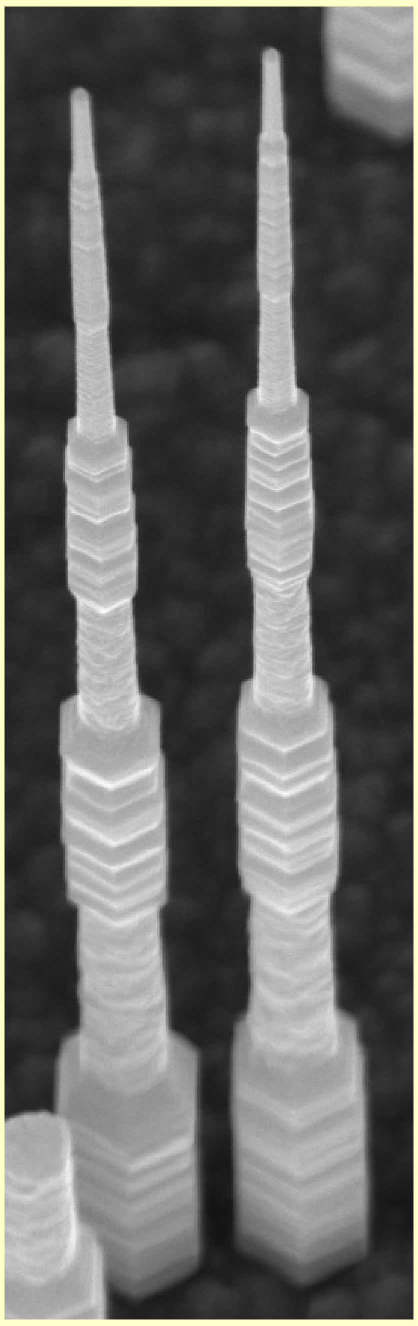
ZERNIKE INSTITUTE COLLOQUIUM

Thursday, January 13th, 2011

16:00h, Lecture Hall: 5111.0080 **Coffee and cakes from 15:30h**

Periodic Nanowire Structures

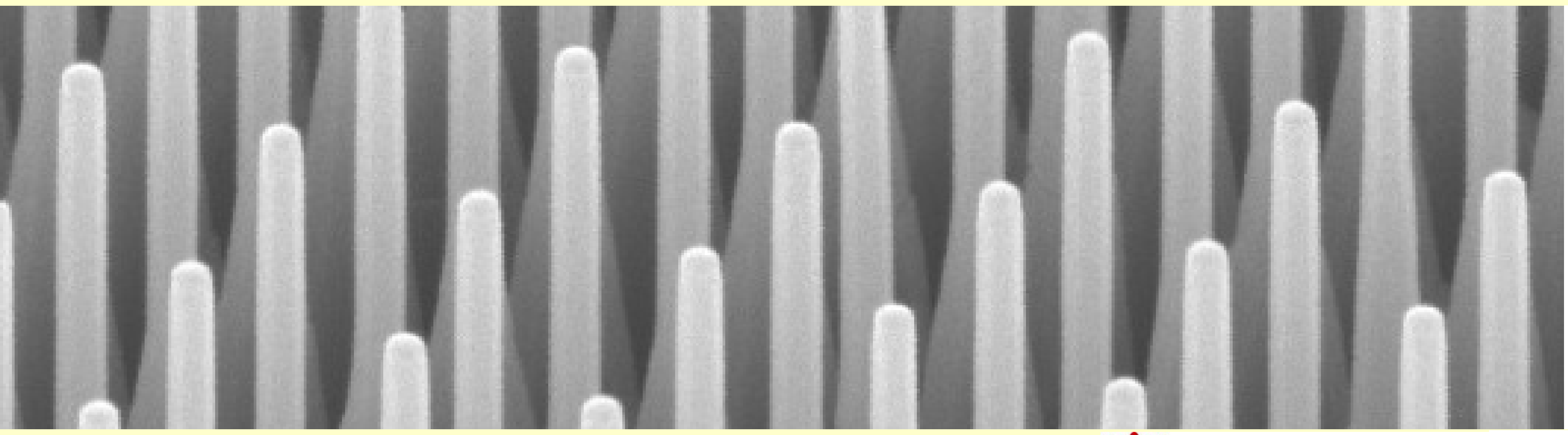
Erik Bakkers
Eindhoven University of Technology &
Delft University of Technology

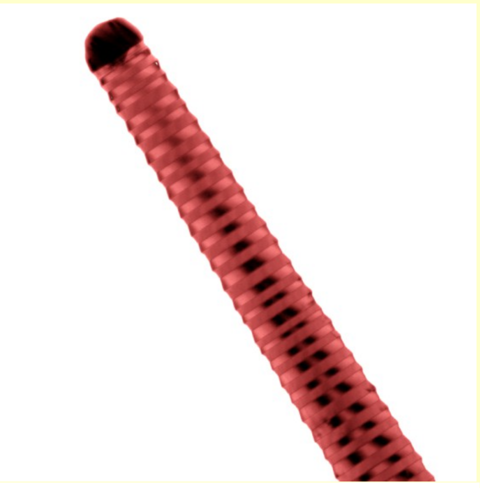


Semiconducting nanowires offer the possibility of nearly unlimited complex bottom-up design on intrawire and interwire level, which allows for new (opto-) electronic device concepts, such as single-photon nanowire quantum dot emitters. On the interwire level, a lot of progress has been made on control of the nanowire position and appreciation of absolute growth rates.

Here, we demonstrate control of the crystal structure of indium phosphide (InP) and gallium phosphide (GaP) nanowires by impurity dopants. More importantly, we demonstrate that we can, once we have enforced the zinc blende crystal structure, induce twinning superlattices with long-range order in the z-direction in the nanowires.

The spacing of the superlattices is tuned by the wire diameter and the zinc dopant concentration. These findings have been quantitatively modelled based on the cross-sectional shape of the zinc-blende nanowires. We show that we can transfer the crystal and defect superstructure from a core (GaP) to a shell (Si) material, resulting in a new class of materials.





university of groningen

Zernike Institute for Advanced Materials