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## Semiconductor nanowire-based quantum materials for advanced enabling optoelectronics

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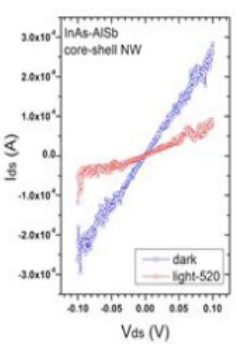
The control of optical and transport properties of semiconductor heterostructures is crucial for engineering new nanoscale photonic and electrical devices with diverse functions. One-dimensional structure offers a number of advances in tailoring material composition, optical and electrical properties, bandgap, and quantum confinement. Quantum material of core-shell nanowire is an outstanding example where the shell layer plays a key role in prompting materials properties and device performance.

Here, we report the realization of unique InAsSb-based core-shell nanowires and their application for room temperature infrared photodetection. The advances of these core-shell nanowires will be discussed. We will also demonstrate core-shell nanowire photodetectors with a dramatic dark current reduction in 2 orders of magnitude and a massive photocurrent (6-fold) in comparison with bare InAs nanowire photodetector. Our study demonstrates the potential of core-shell nanowires for the next generation of photodetectors on silicon.






## Biography

Qian-Dong Zhuang is a Reader in the Physics Department at Lancaster University UK. He is the group leader of MBE Research Laboratory. His current research is focused on novelsemicodnuctor quantum materials and quantum devices. He has published 2 book chapters and more than 90 papers in peer-reviewed scientific journals. He is an Editorial Member of Nature Scientific Reports and IoP Journal of Semiconductors.