



Tsinghua University
Department of Physics

Thursday Colloquium 2012

Fall

Exploring the Peculiar Physical Properties and Possible Applications of Semiconductor Nanowires

Abstract

Nanowires have been a top-five focused research topics in physics, and stimulated intensive interests world-wide. This lecture composes of two major parts. In the first part, I will give a brief summary of our pioneer and leading contributions to the world-wide nanowire research. (1), We are the pioneers to synthesize silicon nanowires from the bottom via a catalytic-directed growth of semiconductor nanowires. (2), We extended the concept of nanowire synthesis to a wide variety of metal oxide nanowires. (3), It is further demonstrated that the physical properties of the semiconductor nanowires can be modified via chemical doping, magnetic and strain fields. (4), We are the first to provide the experimental evidence of quantum confinement effect in silicon nanowires. (5), We are the few pioneers to explore the field emission properties of nanowire arrays. In the main second part, I will extend to show the advantage of both high spatial and energy resolution cathodoluminescence (CL) in characterization of the fine structures of the nanomaterials. In particularly, I will demonstrate that the high special resolution of the CL at ~ 5.5 K enable us to address the significant strain modulation of the optical emission and electronic structures of semiconductor nano/micro wires.

Speaker

俞大鹏，北京大学物理学院教授。1993 年在法国南巴黎大学固体物理实验室获博士学位。2000年获得国家杰出青年科学基金，2002年获得教育部长江学者特聘教授，是教育部长江学者与创新计划“新型低维功能结构与物理”创新团队学术带头人。主要研究方向为准一维半导体纳米结构与物理性质研究，是国际纳米线研究的创始人之一，在纳米线的制备、物理性质和器件效应研究方面做了出色的工作。共在国际核心专业刊物上发表360多篇论文，被国内外其他同行累计引用超过10000次，H因子为54。



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Zheng Yu-Tong Lecture Hall, New Science Building

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教授

<http://www.phys.tsinghua.edu.cn/Colloquium/>