北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Nanoscale characterization of materials and devices using SPM-based spectroscopies

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时间：2017年9月30日 （周六）上午10:00

Venue: Room W663, Physics building, Peking University

地点：北京大学物理楼，西663会议室

Abstract

As the size of devices and the thickness of films have been reduced, nanoscale characterization of materials and devices has become important to understand microscopic mechanisms limiting device performance. For this purpose, various scanning probe microscope (SPM) based spectroscopic techniques have been invented and applied [1].

In this talk, I'll demonstrate the nanoscale characterization in graphene devices, i) the importance of the edge channel using scanning gate microscopy [2] and ii) the many-body graphene physics using scanning tunneling microscopy [3], respectively. Then, I'll introduce a newly emerged SPM-based photothermal induced resonance (PTIR) technique [4,5], which combines atomic force microscope and optical spectroscopy. I'll discuss the materials properties of organometal trihalide perovskite photovoltaic materials and metamaterials at nanoscale measured by using PTIR [6-9]. Very recently, I succeeded to improve the sensitivity of PTIR by ~ 50 folds as applying optomechanical resonance tips to PTIR. I'll briefly discuss the improved sensitivity down to single molecules and the new measurement scheme in thermal relaxation properties of materials. [10]

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About the speaker

2017 – present	Center for Quantum Nanoscience, Institute for Basic Science
2013 - 2016	CNST/NIST and University of Maryland, Postdoctoral Research Associate
2010 - 2013	CNST/NIST and University of Maryland, Postdoctoral Research Associate
2004 - 2010	Seoul National University (Korea), Ph. D. Candidate
2002 - 2004	Seoul National University (Korea), M. S. Candidate