北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

From epitaxy to science and processing technologies of novel van der Waals crystals

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Time: 10:00am, June 14, 2018 (Thursday)

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Venue: Room W563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

The continuous miniaturization of electronic devices has propelled modern technologies to higher performance, but further progress may require a shift from traditional semiconductors towards new systems and integration technologies. The development of van der Waals (vdW) heterostructures made by stacking two-dimensional (2D) crystals has led to the discovery of new phenomena and the realization of new functional devices. Among these vdW crystals, metal chalcogenides (InSe, GaSe, etc.) compounds represent promising semiconductors for both science and technology. This talk reviews my recent research on this new class of 2D semiconductor crystals. From the growth and fundamental studies of 2D layers and heterostructures to the demonstration of prototype devices, I will discuss how these systems can provide a platform for scientific investigations and new routes to 2D electronics and optoelectronics, including high mobility field effect transistors, quantum metrology and fast photonics [1-5].

[1] G.W. Mudd et al., Advanced Materials 25, 5714 (2013); ibidem 27, 3760 (2015).
[2] D.A. Bandurin et al. Nature Nanotechnology 12, 223, (2017).
[3] Z.R. Kudrynskyi et al. Physical Review Letters 119, 157701 (2017).
[4] M. Hamer et al. Nano Letters 2018 (https://pubs.acs.org/doi/abs/10.1021/acs.nanolett.8b01376)
[5] F. Moro et al., Adv. Science 2018 (https://onlinelibrary.wiley.com/doi/abs/10.1002/advs.201800257)

About the speaker

Prof. Patanè studied at the University of Rome “La Sapienza” where she graduated with first-class honours in Physics in 1994 and obtained a PhD in 1997. She worked as an EPSRC Research Associate (1998-2002) at the University of Nottingham, appointed Lecturer at Nottingham in 2002, and later promoted to Associate Professor (2006) and Professor of Physics (2011). Her research focuses on the quantum behavior of electrons in semiconductors, most recently on two dimensional van der Waals crystals. Her research achievements were recognized by the Sir Charles Vernon Boys Medal and Prize of the Institute of Physics (2007), an EPSRC Advanced Research Fellowship (2004-09), a Leverhulme Trust Research Fellowship (2017-19), and the Chinese Academy of Sciences President’s International Fellowship (2018). She is Vice-Chair of the International Union of Pure and Applied Physics Commission (IUPAP, Semiconductor Commission 2018-20) and a member of the Council Board of the European Magnetic Field Laboratory (2015-20).

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