# 北京大学量子材料科学中心

International Center for Quantum Materials, PKU

## Weekly Seminar

# Probing magnetism in zigzag graphene nanoribbon embedded in *h*-BN in the ballistic transport regime


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**Time: 3:00pm, Mar. 15, 2023 (Wednesday)**

**时间：2023年3月15日 （周三）下午3:00**

**Venue: Room w563, Physics building, Peking University**

**地点：北京大学物理楼，西563会议室**

## Abstract


Zigzag edges of graphene have long been predicted to exhibit magnetic electronic state near the Fermi level, which can cause spin-related phenomena and offer unique potentials for graphene-based spintronics. Here, we report the signatures of magnetism in zigzag graphene nanoribbons (zGNRs) embedded in *h*-BN by performing magneto-transport measurements in the ballistic regime. The in-plane bonding with BN can stabilize the edges of zGNRs, and thus enable a direct probing of the intrinsic magnetism. Fabry-Pérot interference patterns were observed in a zGNR transistor at 4 Kelvin, which indicates a coherent transport through the channel. A large magnetoresistance of ~175 Ω, corresponding to a ratio of ~1.3 %, was observed at the same temperature. Such magneto-transport signal is highly anisotropic on the magnetic field direction, and its appearance extends well above room temperature. All these evidences corroborate the existence of robust magnetic ordering in the edge state of zGNR.


## About the speaker

Dr. Wang is an experimental scientist, working in low-dimensional carbon materials and their devices. He received his Ph.D degree in the department of electrical and computer engineering of National University of Singapore in 2009. At the end of 2011, Dr. Wang was appointed as a research professor in SIMIT. His current research interest focuses on fabrication of novel low dimensional carbon materials and exploration of their transport properties. Recently, Dr. Wang made great progresses in direct growth of graphene and its nanostructures on hexagonal boron nitride, including alignment determination, gaseous catalyst assisted growth, edge control of graphene domains and fabrication of oriented graphene nanoribbons. The progresses are recognized in research community of 2D materials and shine a light on further application of 2D materials in nano-electronics and metrology in future. Dr. Wang published 69 peer-reviewed papers in scientific Journals, including Nature Materials, Nature Reviews Physics *et al.* and holds 31 invention patents. He was awarded the First Prize of Shanghai Natural Science Award in 2020.

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