



## Weekly Seminar

# Exploring Proximity Coupling for Novel Spin-Dependent Phenomena

**Jing Shi**

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**Time: 4:00pm, June. 13, 2018 (Wednesday)**

**时间: 2018年6月13日 (周三) 下午 4:00**

**Venue: Room W563, Physics Building, Peking University**

**地点: 北京大学物理楼 西563**

### Abstract

In heterostructures made of two dissimilar materials, proximity coupling at the interface can have profound consequences on the physical properties of both. Numerous examples exist in condensed matter physics. I will present our recent work on proximity effects to induce spin-orbit coupling (SOC) and exchange interaction. In graphene/transition metal dichalcogenide (TMD) heterostructures, we have successfully induced up to 1.5 meV in Rashba SOC (two-three orders of magnitude greater than the intrinsic SOC strength) in graphene measured by quantum transport. To induce exchange interaction, we have exploited atomically flat rare-earth iron garnet films (e.g. yttrium iron garnet- YIG and thulium iron garnet- TIG) as the source of the exchange and demonstrated strong exchange interaction in graphene and the surface states of (Bi, Sb)<sub>2</sub>Te<sub>3</sub> topological insulator. These two interactions are essential ingredients for realizing the quantum anomalous Hall state in both systems, which is very exciting for potential spintronic applications.

### About the Speaker

Dr. Jing Shi is Professor of Physics and the director of the DOE-funded Energy Frontier Research Center on Spins and Heat in Nanoscale Electronic Systems (SHINES) at the University of California, Riverside. He received his Ph.D. degree in Physics in 1994 from the University of Illinois at Urbana-Champaign and did his postdoc work on dilute magnetic semiconductors and nanomagnetism at UCSB. Then he worked at Motorola Phoenix Corporate Research Labs as Staff and Senior Staff Scientist on the first generation magnetoresistive random access memory (MRAM), Associate Professor and Professor of Physics at University of Utah before he joined UC Riverside in 2005. Prof. Shi is an author of over 130 papers and an inventor of 11 US patents. He is a fellow of the American Physical Society. .