

# 北京大学量子材料科学中心

International Center for Quantum Materials, PKU

# **Seminar**

# Putting magnetic vortices to work in spintronics



# Prof. Yaroslav Tserkovnyak

Universitysity of California

Time: 10: 00 am, Dec. 12, 2019 (Thursday)

时间: 2019年12月12日 (周四)上午10:00

Venue: Room W563, Physics building, Peking University

地点:北京大学物理楼,西563会议室

### Abstract

Magnetic vortices in thin (anti)ferromagnetic films can realize mobile objects, which can be injected, manipulated, and detected by electrical currents. We develop a nonequilibrium thermodynamic perspective on the emergent topological hydrodynamics of vorticity, as a new paradigm for yielding spintronic functionality. A flow of vorticity injected across a magnetic strip, which can be controlled by the interfacial spin torques, builds up a magnetic winding density along the strip, which is akin to charging a capacitor by an impinging electrical flow. We thus show how a simple insulating magnetic strip can realize an effective RC circuit for vorticity transport and discuss how it can be used for (topological) energy storage.

### About the speaker

#### **Brief Bio**

2013- Now, Professor, Department of Physics and Astronomy, University of California, Los Angeles, USA

2006 – 2013, Assistant and Associate Professor, Department of Physics and Astronomy, University of California, Los Angeles, USA

2003 - 2006 Junior Fellow, Harvard Society of Fellows, Harvard University, USA

2003 Doctor of Philosophy, Department of Physics, Harvard University, USA

#### **AWARDS**

Many prestigious awards including Humboldt Research Award, Germany (2017); Breakthrough Prize in Fundamental Physics (as part of SNO collaboration), USA(2016); American Physical Society Fellow (2015); Simons Fellow in Theoretical Physic (2014); Simons Fellow in Theoretical Physics, USA (2012); National Science Foundation Early Career Award, USA (2009) Alfred P. Sloan Research Fellow, USA (2008).

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