



# 北京大学量子材料科学中心

International Center for Quantum Materials, PKU

## Seminar

# Topological (spin) hydrodynamics in magnetic insulators

*Prof. Yaroslav Tserkovnyak  
University of California*



**Time: 10:00am, August 22, 2017 (Tuesday)**

**时间: 2017年8月22日 (周二) 上午 10:00**

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

**地点: 北京大学物理楼 西563**

### Abstract

New experimental tools have recently emerged that allow us to explore spin transport phenomena in essentially any material, either electrically conducting or insulating. Namely, multiterminal electrical circuits allow for injection of spin currents using the spin Hall effect and detection using the reciprocal process. Similarly, the reciprocal spin Seebeck and Peltier effects can be utilized to inject and detect spin currents thermally. A range of transport regimes for transmitting nonlocal spin signals through insulating media have recently been discussed, with a focus on magnetically-ordered, e.g., ferromagnetic or antiferromagnetic, materials. In this talk, I will review these developments, with a focus on spin superfluidity and related topological aspects, which mitigate the detrimental spin-relaxation processes. In certain cases, the spin transport is entirely superseded by the flow of an emergent topological charge associated with dynamical magnetic textures.

### About the Speaker

Yaroslav Tserkovnyak received Doctor of Philosophy from the Department of Physics, Harvard University, USA in 2003. He was a Junior Fellow, Harvard Society of Fellows in Harvard University, USA from 2003 to 2006. After 2006, he worked in the Department of Physics and Astronomy, University of California, Los Angeles as an assistant/associate professor. From 2013 to now, he has been a professor in Department of Physics and Astronomy, University of California, Los Angeles, USA. Prof. Yaroslav Tserkovnyak has received 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).