



Seminar

Nanomaterials Playground: Magnetic Skyrmions, Magneto-Ionics and Metal Foams

Prof. Kai Liu

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Time: 10:00am, Dec. 19, 2017 (Tuesday)

时间: 2017年12月19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会议室

Abstract

Nanomaterials offer an exciting platform to address grand challenges in the post-Moore's law era. In this talk I will illustrate some of our current efforts. For example, in recently discovered magnetic skyrmions, mostly at low temperatures, the unique spin texture and the topologically protected quantum state offer great potentials for low dissipation magnetic information storage. We have demonstrated the realization of artificial Bloch skyrmion lattices, as well as planar skyrmion lattices, in their ground state at room temperature [1]. In a second area, we have demonstrated effective magneto-ionic manipulation of metal/oxide interfaces due to a redox-driven oxygen migration, manifested through the interface-sensitive exchange bias effect [2] and controllable under an electric field [3]. Similar effects are also found in getter-metal/perovskites, where the ferromagnetism is sensitively moderated by O-migration [4]. More recently, we have achieved ultra-lightweight palladium nanowire foams that exhibit highly attractive characteristics for hydrogen storage [5].

1. *Nature Communications* **6**, 8462, (2015).
2. *Nature Communications* **7**, 11050 (2016).
3. *Nature Communications* **7**, 12264 (2016).
4. *Appl. Phys. Lett.* **108**, 082405 (2016).
5. *Chem. Mater.* **29**, 9814 (2017).

About the speaker

Prof. Kai Liu received his Ph.D. in Physics from the Johns Hopkins University in 1998. He then carried out postdoctoral research at the University of California - San Diego. He joined the University of California - Davis faculty in 2001, where he was promoted to Associate Professor in 2005 and Professor in 2008. His research interest is in experimental studies of magnetism and spin transport in nanostructured materials. He was recipient of an Alfred P. Sloan Research Fellowship (2005) and a UC Davis Chancellor's Fellowship (2007). He is also elected Fellow of the Institute of Physics (UK, 2011), American Physical Society (2012) and IEEE (2016). He served as the General Chair for the 61st Annual Conference on Magnetism and Magnetic Materials (2016 MMM). He has been a member of the International Union of Pure and Applied Physics (IUPAP) Commission on Magnetism since 2015, and will become the Commission Secretary in 2018. He will join APL Materials as an Associate Editor in 2018.