



## ICQM Seminar

# Carrier-Dopant Interactions in CdMnSe Quantum Dots and Magnon Thermopower in FePt Thin Films

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**Time: 10:30am, Jun. 27, 2013 (Thursday)**

**时间: 2013年6月27日 (周四) 上午10:30am**

**Venue: Room 607, Conference Room A, Science Building 5**

**地点: 理科五号楼607会议室**

### Abstract

In this talk, I will discuss two pieces of our recent work: 1. Carrier-dopant interactions in colloidal quantum dots: Quantum confinement plays an important role in electronic structure and physical properties of semiconductors. We use solution phase techniques to synthesize zero-dimensional colloidal quantum dots. We dope these quantum dots with magnetic impurities and study carrier-dopant exchange interactions in such systems, using circularly polarized magneto-photoluminescence. Through confinement and wave function engineering using core/shell heterostructures, we were able to tune the exchange coupling and therefore the sign of carrier spin polarization; 2. Thermopower in FePt thin film: FePt thin films with large magnetocrystalline anisotropy are promising candidate materials for future high density magnetic data storage media. Understanding its thermal transport properties will help us to gain insights into the ultimate limit of storage density and switching speed. We have done the first thermopower measurement on FePt thin films. We found peculiar temperature dependence of thermopower, which we attribute to the dominating role of electron-magnon interactions.

### About the Speaker

Hao Zeng received his B.S. degree from Nanjing University in 1993 and Ph.D. from University of Nebraska in 2001, both in physics. He was a postdoc fellow at IBM Thomas J Watson Research Center between 2001 and 2004. He joined the Physics Department at the University at Buffalo, the State University of New York as an Assistant Professor in 2004. In September 2009 he was promoted to tenured Associate Professor. He is the recipient of an IBM Research Division Award, National Science Foundation CAREER award, UB Exceptional Scholar Award and Li Xun Young Scientist Lecture Series Award. Dr. Zeng has published more than 70 papers with total citation of > 6,500 times, with 15 papers cited for more than 100 times. Dr. Zeng's main research area is condensed matter and materials physics. His present research interests focus on nanoscale magnetism and spintronics, materials for energy applications and biomagnetics.