

# *Chez Pierre*

Presents ...

**Tuesday, February 18, 2014**

**12:00pm**

**MIT Room 4-331**



## **Special Chez Pierre Seminar**

**Weibo Gao**

**ETH – Zurich, Switzerland**

### ***“Quantum control of interactions between spin and photons in semiconductor quantum dot”***

Quantum optics and transport represent two complementary approaches to study solid state physics. In my talk, I will focus on the former one, and describe our recent experiments on optically active quantum dots at the intersection of quantum optics, solid physics and quantum information processing. In the first part, I will talk about the entanglement between quantum dot spin and a flying photon, combining the ultrafast all-optical spin manipulation and the superior optical properties of solid-state emitter. In the second part, I will report successful transfer of quantum information between the two quantum dots, thanks to the unprecedented degree of photon-indistinguishability between two distant quantum dot sources. Finally, I will discuss about where we stand and how to overcome the key challenges in this system, and the promising prospect of exploiting our experimental system and quantum optics method to study many other interesting systems, such as mechanical oscillator and two dimensional electron systems.