

Massachusetts Institute of Technology  
Department of Physics

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## Condensed Matter Theory Seminar

### “Spintronics with topological insulators”

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**Abstract:** Three dimensional topological insulators are characterized by topologically protected surface states. The electrons on the surface obey the Dirac equation at low energy. The spin and momentum of the Dirac fermion are tightly related to each other, which offers an interesting laboratory to search for novel spintronics functions.

In this talk, I will present our works on spintronics using topological insulators. I will focus on topological insulators coupled to ferromagnets and discuss magneto transport in ferromagnet junctions, spin diffusion on the topological insulator, and rectification effect. I will also talk about spin and valley coupled transport in topological crystalline insulator junction with a strain.

**References:**

- T. Yokoyama, Y. Tanaka, and N. Nagaosa, Phys. Rev. B 81, 121401(R) (2010).
- T. Yokoyama and Y. Tserkovnyak, Phys. Rev. B 89, 035408 (2014).
- H. T. Ueda, A. Takeuchi, G. Tatara, and T. Yokoyama, Phys. Rev. B 85, 115110 (2012).
- T. Yokoyama, New J. Phys. 16, 085005 (2014).

**3:00pm**  
**Wednesday, February 25, 2015**  
**Duboc Seminar Room (4-331)**