

Massachusetts Institute of Technology  
Department of Physics

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Condensed Matter Theory Seminar

“Ferromagnetic transition in a one-dimensional spin-orbit-coupled metal and its mapping to a new critical point in classical smectic liquid crystals”

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**Abstract:** We study the quantum transition between a paramagnetic and ferromagnetic metal with strong Rashba spin-orbit coupling in one dimension. Using abelian bosonization, we analyze the transition by means of renormalization group analysis, controlled by an  $\epsilon$ -expansion. We show that the absence of inversion symmetry activates terms in the effective low-energy theory, which enhance quantum fluctuations and generically drive the transition first-order. We further demonstrate that the Euclidean action maps this system onto a two-dimensional classical smectic-A -- C phase transition in a magnetic field. We show that the smectic transition is second-order and is controlled by a new critical point.

**12:00pm**  
**Friday, May 19, 2017**  
**\*Low Room (6C-333)**

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Host: Liang Fu