

CORE-CM SEMINAR
Michigan State University

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Topological Spintronics

The surface states of 3D topological insulators are known to possess a spin texture that can potentially be exploited for spintronics applications. I will provide a perspective on the emergence of "topological spintronics," demonstrating how this spin texture can be engineered using either quantum tunneling between surfaces [1] or by breaking time-reversal symmetry [2]. I will then discuss recent experiments that demonstrate striking spintronic phenomena useful for proof-of-concept devices, including a spin-orbit torque of record efficiency [3] and spin pumping at room temperature [4] and a giant electrically-gated anisotropic magnetoresistance at low temperature [5].

1. M. Neupane, A. Richardella *et al.*, Nature Communications 5, 3841 (2014).
2. S.-Y. Xu *et al.*, Nature Physics 8, 616 (2012).
3. A. Mellnik, J. S. Lee, A. Richardella *et al.*, Nature **511**, 449 (2014).
4. M. Jamali, J. S. Lee, *et al.*, arxiv:1407.7940 (submitted).
5. A. Kandala *et al.*, in preparation.

Thursday, September 4, 2014
12:00 PM
BPS 1400
Prof. John McGuire - Host