



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

When Spintronics Meets Topological Materials

by

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Join ZOOM Meeting: <https://qrgo.page.link/yEJyX>



ALL INTERESTED ARE WELCOME

Abstract

Spintronics aims to deliver new technologies for cutting-edge computing and memory devices. One of the challenges is to control magnetic entities via electrical means, which have evolved to using pure spin current. The conversion between charge current and pure spin current can be facilitated in materials with strong spin-orbit coupling. The search for novel materials with strong spin-orbit coupling is a recurring theme in the pursuit of more efficient spin-charge conversion in spintronic applications. Particularly promising are the topological insulators, where strong spin-orbit coupling induces nontrivial band topology and gives rise to unique properties such as spin-chiral surface states. On the other hand, broken inversion symmetry at the interfaces, combined with spin-orbit coupling, gives rise to topological magnetic structures which can be exploited for nonvolatile information storage and energy-efficient computing devices. In this talk we discuss the benefits of incorporating topological materials into spintronic devices. We show that the topological Kondo insulator SmB_6 can serve both as an efficient spin current generator [1] and as an effective spin current detector [2] with long spin diffusion length. We also discuss our experiment of purely electrical switching of magnetic states in multilayer thin films [3] and its connection to a novel spin texture with a high topological charge.

[1] Science Advances 4, eaap8294 (2018).

[2] Physical Review Letters 120, 207206 (2018).

[3] Physical Review Letters 120, 117703 (2018).