



SEMINAR ANNOUNCEMENT

國立中山大學物理系110學年度第二學期專題演講

From emergent material to phenomena for spin current exploration

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Venue

物理館 PH2006

Time

Mar. 17, Thu.

14:10

Abstract:

The topological quantum matters with exciting physical phenomenon protected by the topology in their band or spin structures have taken center stage in the field of condensed matter physics. In the first part of my talk, I will discuss the synthesis and spin current exploration in one of the gapless topological semimetals, the magnetic Weyl semimetal Mn_3Sn thin films, where we observed large anomalous Hall and spin Hall effects, which may originate from the large berry curvature caused by the Weyl nodes [1–4]. In the second part of my talk, I will discuss a novel type of spin Hall effect (SHE), the magnetization dependent spin Hall effect (MDSHE), which breaks the orthogonal relation among the direction of the charge current, spin current, and spin orientation beyond the conventional SHE [7]. The MDSHE allows arbitrary spin accumulation at the film surface controlled by magnetization. These relativistic transport properties have great potential for future electronic, quantum devices, and spintronic applications.

[1] D. Qu et al., Phys. Rev. Mater. 2, 102001(R) (2018)

[2] T. Higo and D. Qu et. al, Appl. Phys. Lett. 113, 202402 (2018)

[3] P. K. Muduli and D. Qu et al., Phys. Rev. B 99, 184425 (2019)

[4] T. Higo and D. Qu et al., Adv. Funct. Mater. 2008971 (2021)

[5] T. C. Chuang and D. Qu* et. al, Phys. Rev. Research 2, 032053(R) (2020)