

Title: Comparative study of Dirac/Weyl semimetals and topological/Chern insulators: thin-film point of view

Abstract: Regarding three-dimensional (3D) topological insulators and semimetals as a stack of constituent 2D topological (or sometimes non-topological) systems is a useful viewpoint. Primarily, concrete theoretical models of the paradigmatic 3D topological phases such as Weyl semimetal (WSM), weak and strong topological insulators (WTI/STI), and Chern insulator (CI), is often constructed in that way. Secondly, fabrication of the corresponding 3D topological material is also done in the same spirit; epitaxial growth technique is employed, making the resulting sample in the form of a thin film. Here, we report our recent work on a comparative study of WSM/CI-type and WTI/STI-type systems [1]. We calculate  $Z$  and  $Z_2$  type indices and study evolution of the topological properties in thin films of such 3D topological systems. Through this comparative study we suggest that WSM is to CI as STI is to WTI. Finally, to test the robustness of our scenario against disorder and relevance to experiments we have also studied numerically the two-terminal conductance of the system using transfer matrix method.

[1] Y. Yoshimura, W. Onishi, K. Kobayashi, T. Ohtsuki and K.-I. Imura, arXiv:1606.02091.