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Comparative study of Weyl semimetal and topological/Chern insulators: bulk-edge correspondence and disorder effects KEN IMURA, YUKINORI YOSHIMURA, AdSM, Hiroshima University, KOJI KOBAYASHI, IMR, Tohoku University, TOMI OHTSUKI, Sophia University — We report our recent study (arXiv:1606.02091) on a comparative study of the paradigmatic 3D topological phases: Weyl semimetal (WSM), strong vs. weak topological insulators (STI/WTI), and Chern insulator (CI). Regarding three-dimensional (3D) topological insulators and semimetals as a stack of constituent 2D topological (or sometimes non-topological) systems is a useful viewpoint. By calculating the Z - and Z_2 -indices for the thin films of such 3D topological phases, we follow dimensional evolution of topological properties from 2D to 3D. It is shown that the counterpart of STI and WTI in the time-reversal symmetry broken CI system are, respectively, WSM and CI phases. The role of bulk-edge correspondence in the STI/WTI and WSM/CI thin films will be highlighted. Transport property of disordered WSM thin films with both bulk and surface contributions is studied numerically.

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