

Investigation and control of topological states in magnetic topological insulator MnBi₂Te₄

Magnetic topological insulators are compounds that exhibit significant topological features that are coupled to the magnetic spin configuration due to electronic wave functions. Because they possess chiral electronic channels without any resistance, these materials have several uses in information storage, charge and spin transport. Because topological insulators exhibit robust boundary states and exotic transport properties, several applications such as quantum information manipulation and coherent spin transport were predicted for these materials once they were discovered. One of the challenges in identifying magnetic topological insulators is having these materials operating at temperatures higher than zero, which intrinsic magnetic insulators such as MnBi₂Te₄ are suggested to solve.

As a result, the investigation of various states for these materials, such as axion insulators and quantum anomalous Hall states, phase transitions, and controlling topological properties of these materials with strain and magnetic field as well as investigation of spin-orbit torques, are outstanding issues that require additional research and investigation.