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Topological Dirac Cone and Glassy Magnetism in $Mn_2Sb_2Te_5$

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Abstract : Intrinsic materials with the simultaneous existence of magnetism and topological states are a crucial frontier of quantum materials research. Very recently, $Mn_2(Bi/Sb)_2Te_5$ has been studied to have the potential to host topological surface states with an intrinsic magnetic order. Here, we studied the magnetic and topological properties of $Mn_2Sb_2Te_5$ single crystals. The magnetisation measurements evidenced the presence of a spin glass state with field-induced ferromagnetism. Though the heat capacity measurements show the absence of any long-range order, the observed anomalous Hall effect in transverse magneto-transport measurements evidences the ferromagnetic ordering in $Mn_2Sb_2Te_5$ single crystals. Angle-resolved photoelectron spectroscopy measurements indicate the presence of the topological Dirac cone. Our work provides valuable insights into the magnetism and topological character of $Mn_2Sb_2Te_5$ and establishes $Mn_2(Bi/Sb)_2Te_5$ system as a fertile ground to play with magnetism and topological states.

Keywords : topological insulators, quantum materials, anomalous quantum hall effect, ARPES, magneto-transport, susceptibility
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