Tata Institute of Fundamental Research
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Webinar

A Study of the Electronic Transport Properties of 3D-Topological Insulators and Magnetic Proximity Effects

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Topological insulators (TIs) are a class of materials that have an insulating bulk state bridged by highly conducting topologically protected surface states. The non-trivial behaviour has gained immense attention in the last decade because of the possibilities it claims to offer in the field of fundamental condensed matter physics and technologies. In this talk, I will discuss about the growth of Bi_2Te_3, a 3D TI with a small band-gap. We grew it on a variety of substrates under similar growth conditions and compare the transport characteristics to understand the quality and nature of the TI growth on each substrate. We performed experiments in planar hall configuration to understand the nature of the bulk transport in these materials. We also explored how the proximity to a magnetic insulator effects the transport of Bi_2Te_3/EuS heterostructure where EuS is a ferromagnetic insulator. We reported the emergence of non-trivial spin textures using the planar Hall measurement configuration. Our studies provide an understanding of electronic transport properties of Bi_2Te_3 in its bulk band regime, its response to planar external magnetic field and also the influence of proximity to magnetic insulator with in plane magnetic anisotropy.

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