

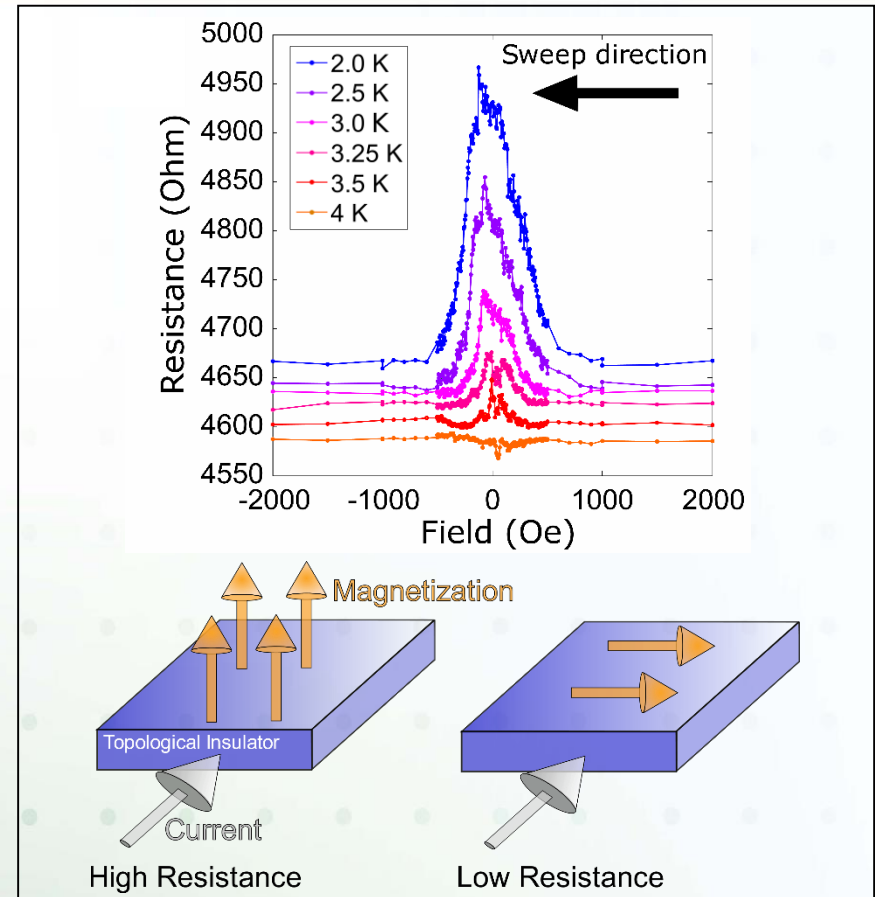
Surface state anisotropic magnetoresistance in proximity magnetized topological insulators

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Information stored in magnetic materials is often read-out by measuring changes in magnetoresistance. Large magnetoresistance effects are thus important for establishing well-defined memory states within materials that store information.

The Illinois MRSEC discovered a new and large magnetoresistance effect generated when a topological insulator (TI) is placed on top of an ordinary magnetic insulator. The surface of the TI becomes magnetic and exhibits a so-called surface-state anisotropic magnetoresistance. This effect is two-orders of magnitude larger than previous effects induced in similar materials.

TIs have already been identified as promising materials which can help switch magnetic states, or write information. Now that these same materials can be used as a medium for storing information their technological potential in information technology has considerably increased.



Data showing onset of surface-state magnetoresistance peak below 4K (above) and schematic showing origin of magnetoresistance (below)