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In-house Research - 2018

Observation of axion physics in condensed matter

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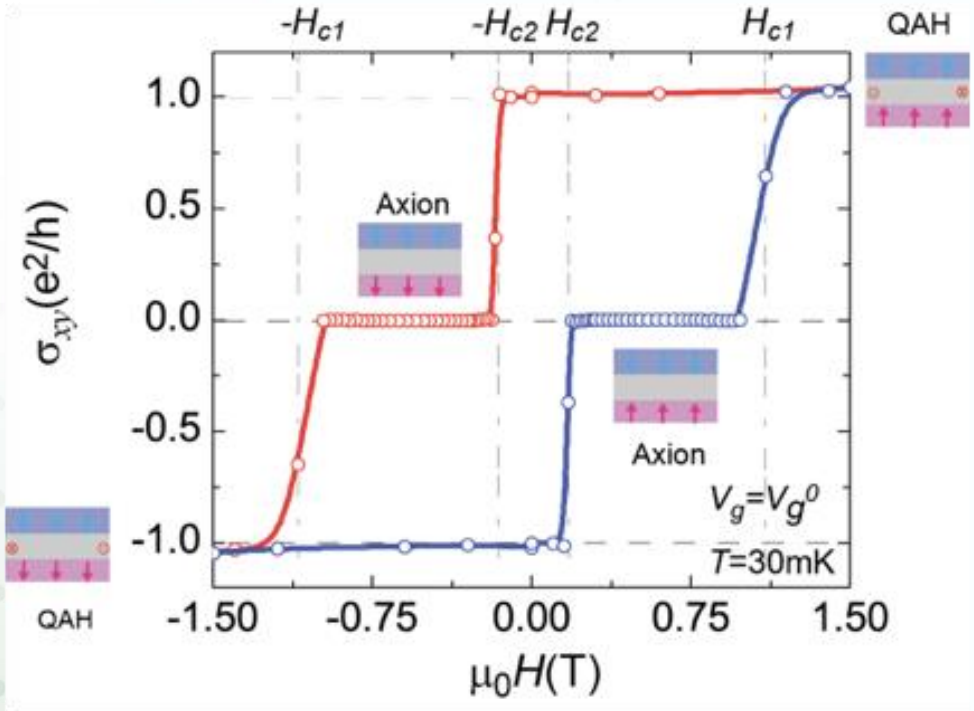
The strongly spin-momentum coupled electronic states on the surfaces of topological insulators (TIs) exist because of time-reversal symmetry. The theoretical description of these states is fundamentally analogous to a picture used to describe particles known as 'axions' theoretically postulated to exist in Nature but never observed. Demonstrating and understanding this conceptual analogy is important for gaining new insights into how our universe works. By interfacing the two opposite surfaces of a TI thin film with different magnetic materials and measuring the magnetic field dependence of the electrical conductance, we show that the 'axion' analogy is robust and leads to a new phase of matter known as an 'axion insulator.'



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