Poster-2-28

Temperature dependence of the energy band gap in ZrTe5: Implications for the topological phase

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Zirconium pentatelluride (ZrTe5) is a widely studied material, with a single band with an aproximately conical dispersion in the centre of a Brillouin zone and a narrow energy band gap. ZrTe5 is predicted to be a topological insulator [1], however, to this day there is no consensus on whether it is a strong [2] or weak [3] topological insulator as different studies (both experimental and theoretical) show contradicting results.
Using Landau-level spectroscopy, we determine the temperature dependence of the energy band gap in ZrTe5. We find that the band gap reaches Eg = (5±1) meV at low temperatures and increases monotonically when the temperature is raised. This implies that ZrTe5 is a weak topological insulator, with noninverted ordering of electronic bands in the center of the Brillouin zone [4]. Our magnetotransport experiments performed in parallel show that the resistivity anomaly in ZrTe5 is not connected with the temperature dependence of the band gap.

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