ONE-DIMENSIONAL CHIRAL EDGE TRANSPORT IN A TOPOLOGICAL KONDO INSULATOR

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Topological Kondo insulators, a novel class of matter, can be characterized by non-trivial metallic boundary states robust against perturbations with time reversal symmetry in the bulk energy gap driven by strong electron correlations. Theoretically predicted, canonical Kondo compound SmB_6 is believed to be a most promising candidate for the correlated topological insulator, providing the metallic surface states in the Kondo hybridization gap at low temperatures [1]. However, due to lack of direct observation for chiral surface conduction, the topological aspects of the surface state have been unclear.

Here, we present systematic studies on very low-temperature magneto-transport, revealing unusual ferromagnetic hysteresis with a sign reversal (Fig.1) originating from chiral edge conduction channels on the ferromagnetic domain walls on the surface [2]. Together with the suppression of the weak antilocalization and observation of anomalous Hall effect in the surface conduction, this unusual hysteresis gives strong evidence for the existence of topologically non-trivial surface states in SmB_6.

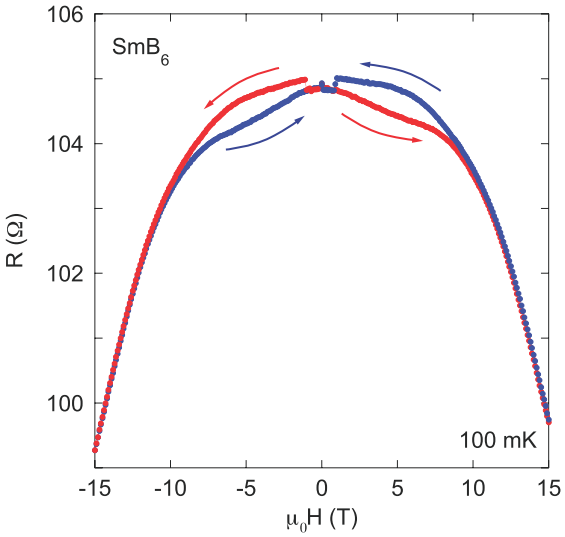

Figure 1. Magnetoresistance hysteresis loop of SmB_6 in perpendicular magnetic field orientation (I // [100], H // [001]) at 100 mK.

[1] M. Dzero, *et al*., Phys. Rev. Lett. **104**, 106408 (2010).
[2] Y. Nakajima, *et al*., Nature Physics, (2015) Advance Online Publication, doi:10.1038/nphys3555.

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