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Surface conductance and one-dimensional edge state transport in topological Kondo insulator SmB_6[1]

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The Kondo insulator compound SmB_6, with hybridization between itinerant conduction electrons and localized f-electrons driving an insulating gap and metallic surface states at low temperatures, is an ideal candidate for realizing the topological Kondo insulator state. By exploiting the presence of a time reversal symmetry breaking surface ferromagnetic state, we investigate the topological nature of metallic surface states, finding evidence of one-dimensional surface transport with conductance values approaching the quantized value of e^2/h and originating from the chiral edge channels of ferromagnetic domain walls. We will review our milliKelvin magnetotransport measurements of the edge state transport phemonemon in SmB6, as well as thickness and surface gating studies that conclusively prove the surface nature of low temperature conductance.

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