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Interplay between surface and bulk states in the Topological Kondo Insulator SmB_6 ¹ SANGRAM BISWAS, Department of Physics, Indian Institute of Science, Bangalore 560012, India, MONICA CIOMAGA HATNEAN, GEETHA BALAKRISHNAN, Department of Physics, University of Warwick, Coventry, CV4 7AL, UK, AVEEK BID, Department of Physics, Indian Institute of Science, Bangalore 560012, India — Kondo insulator SmB_6 is predicted to have topologically protected conducting surface states(TSS). We have studied electrical transport through surface states(SS) at ultra-low temperatures in single crystals of SmB_6 using local-nonlocal transport scheme and found a large nonlocal signal at temperatures lower than bulk Kondo gap scale. Using resistance fluctuation spectroscopy, we probed the local and nonlocal transport channels and showed that at low temperatures, transport in this system takes place only through SS. The measured noise in this temperature range arises due to Universal Conductance Fluctuations whose statistics was found to be consistent with theoretical predictions for that of 2D systems in the Symplectic symmetry class. We studied the temperature dependence of noise and found that, unlike the topological insulators of the dichalcogenide family, the noise in surface and bulk conduction channels in SmB_6 are uncorrelated - at sufficiently low temperatures, the bulk has no discernible contribution to electrical transport in SmB_6 making it an ideal platform for probing the physics of TSS.

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SANGRAM BISWAS
Department of Physics, Indian Institute of Science, Bangalore 560012, India

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