

Abstract Submitted
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Study of bulk resistivity of SmB_6 below the bulk to surface crossover temperature using non-local Corbino transport.¹ YUN SUK EO, JUNIAR LUCIEN, KAI SUN, CAGLIYAN KURDAK, University of Michigan, PRISCILA FERRARI S. ROSA, Los Alamos National Laboratory, ZACHARY FISK, University of California Irvine — There is growing evidence that samarium hexaboride (SmB_6) is a unique material that has a truly insulating bulk and topologically protected metallic surface states. It has a well-known resistance plateau below ~ 4 K due to the crossover from bulk to surface conduction. Below this crossover temperature, conventional transport measurements can only detect surface properties, because there is little current flowing through the bulk. Because of this, questions remain about whether the bulk behavior above and below the crossover is identical, or whether exotic bulk states are present, as some experiments have suggested. Here, we introduce a non-local measurement technique that employs Corbino structures on the surface to detect bulk behavior below ~ 4 K. We use two types of structures, a Corbino with two additional rings, or two sets of coaxially aligned Corbinos on the top and bottom surfaces. Using these structures, we measured bulk conductivity at temperatures down to ~ 2 K, where surface conductivity dominates transport by many orders of magnitude. We find that the bulk behavior is identical above and below the crossover temperature, and that the activation energy is 3.3 meV.

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