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Low Field Magnetoresistance Measurements on the Surface States of Samarium Hexaboride using Corbino Structures[1] YUN SUK EO, STEVEN WOLGAST, CAGLIYAN KURDAK, GANG LI, ZIJI XIANG, COLIN TINSMAN, TOMOYA ASABA, BENJAMIN LAWSON, FAN YU, LU LI, KAI SUN, JAMES ALLEN, Randall Laboratory of Physics, University of Michigan, DAE-JEONG KIM, ZACHARY FISK, Dept. of Physics and Astronomy, University of California, Irvine — Recently, SmB_6 attracted great attention by numerous reports suggesting it to be an ideal strong 3D topological insulator. By spin-momentum locking, the quantum correction of conductivity of a topological surface state of this material is expected to result in weak anti-localization (WAL). To study this effect, we have performed low field magnetorestance measurements on (100) and (110) Corbino samples at temperatures down to 60 mK. Many of the Corbino samples that we have studied so far have a dip in the magnetoresistance trace that resembles the WAL feature. The size and temperature dependence of this feature are in general consistent with those expected from a quantum interference correction. However, after careful investigation we found the features shrink in amplitude with slower magnetic field sweep rates. Also, the traces have a hysteretic signal of an unknown origin. The potential coupling between a magnetic oxide layer forming on the surfaces of SmB_6 and the topological surface states will be discussed.

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Yun Suk Eo
Randall Laboratory of Physics, University of Michigan

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