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Measuring Surface and Bulk Conductance of a Topological Insulator Using Top and Bottom Contacts[1] YUN SUK EO, STEVEN WOLGAST, CAGLIYAN KURDAK, Randall Laboratory of Physics, University of Michigan - Ann Arbor — In most 3D topological insulators, the existence of bulk conduction makes electrical transport measurements of the surface conduction very challenging. Standard transport measurements that are performed only on one side of a bulk crystal are not capable of distinguishing surface conduction from bulk conduction. Recently, configurations that measure top and bottom surfaces together have enabled researchers to distinguish surface conduction from bulk conduction in the mixed-valence compound SmB_6.[2,3] Inspired by these measurements, we analyze different types of top/bottom transport geometries such as a Corbino disc patterned on the top surface/a metal disc patterned on the bottom surface, a four prong measurement on the top/entirely metalized on the bottom, etc. by numerical simulations. Although each configuration has certain limitations, the surface and bulk conductance can be found respectively from our results.

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[2]Wolgast et al., Phys. Rev. B **88**, 180405(2013)
[3]D. Kim et al., Scientific Reports **3**, 3150 (2013)

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