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Magnetotransport properties of topological surface states in the presence of ferromagnetic order KUNAL TIWARI, WILLIAM COISH, TAMI PEREG-BARNEA, McGill University — The surface of a 3D topological insulator hosts a two dimensional Dirac cone which is robust to weak, non-magnetic perturbation. Its presence will dominate low energy transport since the bulk is gapped. However, once magnetic impurities are introduced to the surface they may gap the Dirac dispersion, suppressing or modifying the systems surface transport properties. In particular, in the presence of uniform ferromagnetic order, the Dirac cone becomes massive and should not conduct for energies near the Dirac point. On the other hand, if the ferromagnetic order has domains with different magnetization directions, current may be carried on the domain walls where the Dirac mass vanishes. Our research aims to elucidate the transport properties of topological insulators in the presence of magnetic domain structures. Our work may be relevant to recent studies on the Kondo topological insulator SmB_6 .

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