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Magnetic impurities on the surface of a topological insulator[1] QIN LIU, CHAO-XING LIU, CENKE XU, XIAO-LIANG QI, SHOU-CHENG ZHANG — The surface states of a topological insulator are described by an emergent relativistic massless Dirac equation in 2+1 dimensions. In contrast to graphene, there is an odd number of Dirac points, and the electron spin is directly coupled to the momentum. We show that a magnetic impurity opens up a local gap and suppresses the local density of states. Furthermore, the Dirac electronic states mediate an RKKY interaction among the magnetic impurities which is always ferromagnetic, whenever the chemical potential lies near the Dirac point. These effects can be directly measured in STM experiments. We also study the case of quenched disorder through a renormalization group analysis.

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Qin Liu

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