

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Topological insulators with magnetic impurities in the bulk GILAD ROSENBERG, MARCEL FRANZ, University of British Columbia — We show that a three dimensional topological insulator with magnetic impurities could have a regime where the surface is magnetically ordered but the bulk is not. This is in contrast to conventional materials where bulk ordered phases are typically more robust than surface ordered phases. This difference originates from the topologically protected gapless surface states characteristic of topological insulators. We study the problem using a mean field approach, using two concrete models that give the same qualitative result, with some interesting differences. This work could help explain recent experimental results showing the emergence of a spectral gap in the surface state of Bi_2Se_3 doped with Mn or Fe atoms, but with no measurable bulk magnetism.

[1] Massive Dirac Fermion on the Surface of a Magnetically Doped Topological Insulator, Y. L. Chen *et al.*, Science **329**, 659-662 (2010).

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Date submitted: 05 Oct 2011

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