Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Interface states of the topological insulator Bi_2Se_3 NIRAJ ARYAL, Florida State Univ, EFSTRATIOS MANOUSAKIS, Florida State Univ and National and Kapodistrian University of Athens — Investigation of interface states in topological insulators is important for both potential applications and for emergent fundamental phenomena. Here, we investigate such interface states for various cases using density functional theory. We are interested in the following cases: (a) the interface of the topological insulator (TI) Bi_2Se_3 with itself when we allow an atomically thin spatial gap between the two parts, (b) the interface of the TI above with a metal (M), and (c) the interface of the TI with a typical band insulator. In the case (a) we find that as a function of the distance, the interface states undergo a drastic transformation, namely an inteface Dirac-like state forms quickly as the distance between the two TI parts increases. In the case (b) we find that the nature of the interface states depends on the type of the metallic contact. Our preliminary results for the last case (c) above indicate various different ways of reconstruction of the interface states.

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Date submitted: 11 Nov 2016 Electronic form version 1.4