

Abstract Submitted
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Vacancy-induced bound states in topological insulators WENYU SHAN, JIE LU, HAIZHOU LU, SHUNQING SHEN, Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong — We present an exact solution of a modified Dirac equation for topological insulator in the presence of a hole or vacancy to demonstrate that vacancies may induce bound states in the band gap of topological insulators. They arise due to the Z_2 classification of time-reversal invariant insulators, thus are also topologically-protected like the edge states in the quantum spin Hall effect and the surface states in three-dimensional topological insulators. Coexistence of the in-gap bound states and the edge or surface states in topological insulators suggests that imperfections may affect transport properties of topological insulators via additional bound states near the system boundary.

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