

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Hidden-Symmetry-Protected Topological Semimetals on a Square Lattice**<sup>1</sup> JING-MIN HOU, Southeast University — We study a two-dimensional fermionic square lattice, which supports the existence of two-dimensional Weyl semimetal, quantum anomalous Hall effect, and  $2\pi$ -flux topological semimetal in different parameter ranges. We show that the band degenerate points of the two-dimensional Weyl semimetal and  $2\pi$ -flux topological semimetal are protected by two distinct novel hidden symmetries, which both corresponds to antiunitary composite operations. When these hidden symmetries are broken, a gap opens between the conduction and valence bands, turning the system into a insulator. With appropriate parameters, a quantum anomalous Hall effect emerges. The degenerate point at the boundary between the quantum anomalous Hall insulator and trivial band insulator is also protected by the hidden symmetry. [PRL 111, 130403(2013)]

<sup>1</sup>This work was supported by the National Natural Science Foundation of China under Grants No. 11004028 and No. 11274061.

Jing-Min Hou  
Southeast University

Date submitted: 31 Oct 2013

Electronic form version 1.4