

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Dirac Electrons in Silicene on Ag(111): Do they exist? CHI-RUEI PAN, Georgia Institute of Technology, MEI-YIN CHOU, Georgia Institute of Technology and Academia Sinica — There have been quite a few experimental attempts to grow silicene on Ag(111) in the past two years. However, there are still controversies about whether a silicene layer with massless Dirac fermions actually exists on Ag(111). Chen *et al.* [1] measured the interference patterns in the differential conductance map by scanning tunneling spectroscopy and found a linear dispersion relation as the evidence for the existence of massless Dirac fermions. On the other hand, Lin *et al.* [2] found no Landau level sequences appearing in the tunneling spectra under a magnetic field, concluding that the Si-Ag interaction is strong enough to break the symmetry of silicene. In order to resolve these conflicting experimental findings, we have studied various Si/Ag configurations on the surface and their related electronic structures using first-principles density-functional calculations. Comparisons with experimental results will be discussed. [1] Chen et al. Phys. Rev. Lett. 109, 056804 (2012). [2] Lin et al., Phys. Rev. Lett. 110, 076801 (2013).

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Date submitted: 14 Nov 2014

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