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Quasiparticle Interference in Silicene on Ag(111) Surface LAN CHEN, KEHUI WU, Institute of Physics, Chinese Academy of Sciences — Silicene, a single sheet of silicon atoms arranged in a honeycomb lattice analogous to graphene, has been successfully prepared on Ag(111) surface recently. The honeycomb atomic structure of silicene has been confirmed experimentally. However, more important details of the electronic structures of silicene, such as pseudospin or chirality of Dirac Fermions and the shapes of the Dirac cones, still remain illusive. Here we performed scanning tunneling microscopy and spectroscopy to investigate the electronic states of silicene on Ag(111) surface. From the quasiparticle interference (QPI) pattern observed in dI/dV maps, we derived linear energy-momentum dispersion and a large Fermi velocity, which prove the existence of Dirac fermion in silicene. Moreover, through mapping the QPI pattern in q space, we found the Dirac cones of silicene are not circular as in graphene, but significantly warped to hexagon. The theoretical calculations prove that the constant energy contours of Dirac cones of silicene are hexagonal warped due to the unique structure of silicene. Our results pave the way for exploiting anisotropic transport behavior and other exotic quantum effects in silicene.

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