

Hourglass fermions in the non-symmorphic semimetal Nb₃SiTe₆

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Abstract

In 3-dimensional non-symmorphic crystals, band crossings protected by translational symmetry can host Dirac nodal loops in a 2-dimensional cut in the momentum surface. These nodal loops, often with an hourglass shape, give rise to unusual bulk and surface properties, including anisotropic electronic transport and chiral anomaly, based on transport or optical response measurements. This talk will present a detailed study of the band structure of Nb₃SiTe₆ by angle-resolved photoemission spectroscopy. The dispersion relations along the XS direction, which is perpendicular to the sample surface, is mapped out by varying the incident photon energy. The results show that the crossing point (Dirac point) of a Dirac cone at gradually shifts to higher binding in going from X to S. The measurements provide evidence for the presence of a Dirac nodal loop in this system.

Keywords – Dirac semimetals, ARPES, Hourglass fermion, non-symmorphic symmetry