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Spiraling Fermi arcs in Weyl materials[1] SONGCI LI, ANTON AN-
DREEV, Univ of Washington — In Weyl materials the valence and conduction
electron bands touch at an even number of isolated points in the Brillouin zone. In
the vicinity of these points the electron dispersion is linear and may be described by
the massless Dirac equation. This results in nontrivial topology of Berry connection
curvature. One of its consequences is the existence of peculiar surface electron states
whose Fermi surfaces form arcs connecting projections of the Weyl points onto the
surface plane. Band bending near the boundary of the crystal also produces surface
states. We show that in Weyl materials band bending near the crystal surface gives
rise to spiral structure of energy surfaces of arc states. The corresponding Fermi
surface has the shape of a spiral that winds about the projection of the Weyl point
onto the surface plane. The direction of the winding is determined by the helicity
of the Weyl point and the sign of the band bending potential. For close valleys
arc state morphology may be understood in terms of avoided crossing of oppositely
winding spirals.

Songci Li
Univ of Washington

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