Title: Pseudo-atomic orbital based tight-binding model investigation of Fermi Arcs in Na_3Bi.

Name: Vasilios Passias and Lucas Wagner
Affiliation: University of Illinois at Urbana-Champaign

Na_3Bi is a topological Dirac semimetal [1] whose double surface Fermi arcs were initially thought to be topologically protected [1-3]. Angle resolved photoemission spectroscopy (ARPES) measurements on Na_3Bi's (100) facet [4] are consistent with double surface Fermi arcs [1,2]. However, it was shown that bulk symmetry preserving terms that leave the Dirac points unchanged could deform the double surface Fermi arcs into a closed Fermi contour that does not connect to the Dirac points [5] and could be still consistent with the ARPES data.

We investigate how robust the double surface Fermi arcs are to Na_3Bi (100) slabs with different terminations. We construct tight binding models of two Na_3Bi (100) slabs using pseudo-atomic orbitals [6]. Away from the projected Dirac points we find slab termination localized states. Near the projected Dirac points there is a hybridization of surface and bulk states. Both findings are consistent with the predicted behavior of Fermi arcs in Na_3Bi. We find that while the arcs are not strictly topologically protected, they are quite robust for realistic surfaces.

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