

UH Physics Research Day - 2024



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Band Topology of LK-99

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Recent reports of room temperature ambient pressure superconductivity in LK-99 sparked tremendous excitement. While the materials is no longer believed to be superconducting, interest in its electronic and topological properties of the material still stands. Here, we utilize first-principle density functional theory and augment a recently proposed model tight-binding Hamiltonian to study the band topology including the impact of spin-orbit coupling. In the absence of spin-orbit coupling, we observed the presence of two isolated bands situated near the Fermi level. However, upon the introduction of spin-orbit coupling, these two bands split into four bands and generate multiple Weyl points with Chern number ± 2 . We also observe accidental crossings along high symmetry lines which, at the level of our minimal Hamiltonian, extend as nodal surfaces away from these lines.

Academic year

3rd year

Research Advisor

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