

Subhro Bhattacharjee

Title: Spin-Orbit coupled Dirac Fermions

Abstract: We study spin-orbit coupled $J=3/2$ electrons on honeycomb lattice and show that at weak coupling limit, it hosts a $SU(8)$ Dirac semimetal. The nature of the phases proximate to this semi-metal, as we show, depends crucially on the interwinding of the real-space and spin rotation symmetries leading to a novel embedding of the microscopic symmetries on the low energy theory-- very different from graphene.