

Seminar

Topological superconductivity with spin-3/2 half-heusler compounds beyond spin triplet pairing

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Time: 4:00pm, Dec. 21, 2017 (Thurday)

时间: 2017年12月21日 (周四)下午4:00

Venue: Room W563, Physics building, Peking University

地点:北京大学物理楼,西563会议室

Abstract

Multi-component electronic systems are not rare in solid state physics due to the multi-orbital band structure and spin-orbit coupling. They exhibit richer structures of topological superconductivity beyond the conventional scenarios of spin singlet and triplet pairings. We generalize the He3-B type isotropic p-wave topological pairing to the four-component fermion systems, which are effectively described by spin-3/2 fermions. The p-wave triplet and f-wave septet pairings are identified as topologically non-trivial characterized by large topological indices and exhibiting high order Majorana-Dirac surface spectra. Recently, there has been experimental evidence of nodal spin-3/2 superconductivity in the half-Heusler compound YPtBi semi-metal with theoretically proposed p-wave septet pairing gap function. Zero energy Majorana flat bands on the (111)-surface and their signatures in the quasi-particle interference patterns are calculated. In addition, we also discuss how to realize the chiral Majorana modes by a of method starting with a degenerate Fermi surface without spin-orbit coupling. The p\pm i s superconductors develop spontaneous magnetizations on the