

Majorana Bound States and Disclinations in Topological Crystalline Superconductors

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Abstract

We prove a topological criterion for the existence of zero-energy Majorana bound-state on a disclination, a rotation symmetry breaking point defect, in 4-fold symmetric topological crystalline superconductors (TCS). We first establish a complete topological classification of TCS using the Chern invariant and three integral rotation invariants. By analytically and numerically studying disclinations, we algebraically deduce a Z_2 -index that identifies the parity of the number of Majorana zero-modes at a disclination. Surprisingly, we also find weakly-protected Majorana fermions bound at the corners of superconductors with trivial Chern and weak invariants.

About the speaker

Dr Jeffrey Teo completed his BSc and MPhil degrees in the University of Hong Kong under the supervision of Prof Zidan Wang, and then his PhD degree in the University of Pennsylvania under the supervision of Prof Charlie Kane. Dr Teo is now working as a postdoc in the University of Illinois at Urbana-Champaign and focusing mainly on topological insulator and superconductors, low energy exotic defect excitations in topological ordered systems.