2D Topological Superconductivity by Proximity to van Hove Singularities

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<u>Abstract</u>

We show that topologically nontrivial triplet pairing is generically favored in inversion-symmetric systems with van Hove saddle points not at time reversal invariant momenta. This is argued generally from a renormalization group (RG) treatment of these systems with short-range repulsive interactions. As an example, we study hidden quasi-1D lattice systems with such van Hove saddle points by doing both RG and RPA calculations. We find that at and around van Hove singularities the ground states always harbor superconductivity with nontrivial triplet pairing, which results in either strong or weak topological superconductivity. Moreover, it is shown that spin-orbit coupling significantly favors topological pairing. Possible applications to the recently discovered Bi-based superconductors LaOBiS₂ will also be discussed.

Reference: Hong Yao and Fan Yang, in preparation.

About the speaker

Prof Hong Yao obtained his PhD at Stanford University in 2009. He did postdoctoral research at the University of California, Berkeley from 2009 to 2011 and then at Stanford University from 2011 to 2012. He joined the Institute for Advanced Study at Tsinghua University in August 2012 as a Member.