

Seminar

Josephson Junction of Nodal Superconductors

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Monolayer and few-layer transition metal dichalcogenides (TMDs) have been suggested as a platform to study intrinsic and induced unconventional superconductivity. The presence of a strong Ising spin-orbit coupling in these materials locks the spins perpendicular to the surface resulting in remarkable stability to an in-plane magnetic field even beyond the Pauli critical limit. Upon increasing the in-plane magnetic field beyond the Pauli limit, a quantum phase transition occurs into a topological nodal-superconducting phase which is characterised by Majorana flat bands. We use the Bogoliubov-de Gennes (BdG) Hamiltonian formalism to show that the unique topological properties of this non-trivial phase are reflected in the current across junctions of nodal superconductors separated by an insulating barrier. By studying the dependence of the Josephson current on the phase difference between two sides of the junction, one can infer these topological properties.

References:

R.Seshadri, M. Khodas, and D. Meidan (doi: 10.21468/SciPostPhys.12.6.197)

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4:00 PM (Tea / Coffee 3.45 PM)

Seminar Hall, TIFR-H