Unconventional Superconductivity in doped topological semimetals

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The exceptional properties of superconducting topological materials can give rise to a fascinating phenomenon known as topological superconductivity, representing a novel and unconventional form of superconductivity that holds great promise for quantum computation due to its ability to host non-Abelian quasiparticle excitations. These materials have emerged as an exciting frontier within quantum materials, unveiling a multitude of phenomena that are absent in conventional superconductors. The intricate interplay between the topological bulk and surface states in superconducting topological semimetals plays a pivotal role in the emergence of non-s-wave superconductivity, which is essential for realizing unique non-Abelian quasiparticle excitations like Majorana bound states. However, the occurrence of superconductivity in these compounds is rare, and the limited number of known superconducting topological semimetals poses significant challenges in comprehending the underlying mechanisms. Therefore, it is of utmost importance to persist in the exploration and study of new superconducting topological semimetals. In this presentation, I will discuss the recent findings on doped topological semimetals [1, 2, 3].

References:

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