Poster-1-1

Signatures of skyrmion stripes in nematic superconductors

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In a type-II superconductor below T_c, the magnetic field penetrates in the form of flux lines (vortices) which, due to their reciprocal repulsion, arrange into a regular (Abrikosov) lattice. Unlike the standard case, in nematic superconductors, electron pairs are polarized in one, spontaneously chosen direction, thus breaking the rotational symmetry of the normal state. In either case, the overlapping field profiles of the superconducting vortices create a well-defined magnetic field distribution, which can be detected experimentally via local probes such as muons through the degree of their spin depolarization.
Intriguingly, nematic superconductors can host coreless vortices (skyrmions) consisting in a bound state of two spatially separated half-quantum vortices. Such topological excitations are thought to be good candidates for low-power data-storage technologies. Recently, the skyrmion configurations that may arise in nematic superconductors were calculated and predicted to form striped patterns [1]. Remarkably, their μSR signature was shown to correspond to a peculiar two-peak distribution, notably different from that of standard type-II superconductors. By investigating selected nematic superconductors, such as $CaSn_3$ or LiFeAs, we bring compelling evidence of their unusual magnetic response, thus corroborating the skyrmion-stripe scenario [2].

[1] M. Speight, T. Winyard, and E. Babaev, *Phys. Rev. Lett.* **130**, 226002 (2023).
[2] H. Siddiquee et al., *Phys. Rev. B* **105**, 094508 (2022).