Spin-triplet supercurrents of odd and even parity in nanostructured devices

Lahabi, K.

Stellingen

Behorend bij het proefschrift

SPIN-TRIPLET SUPERCURRENTS OF ODD AND EVEN PARITY IN NANOSTRUCTURES DEVICES

1. Micromagnetic simulations provide a powerful tool to study and utilize superconducting triplet correlations in hybrid devices. (*Chapter 4 of this thesis*).

2. Generating long-range triplets with a single ferromagnet could substantially enhance our ability to control supercurrents. (*Chapter 5 of this thesis*).

3. Sr_2RuO_4 could potentially host two different types of half-quantum vortex: one is spin-polarized while the other is not. (*Chapters 6 and 7 of this thesis*).

4. Mesoscopic structures of Sr_2RuO_4 allow theoretical simulations to be directly compared with experiment. (*Chapter 7 of this thesis*).

5. Harvesting the spin-polarization of triplet correlations in magnetic hybrids is usually viewed as their sole application, while their unique potential for controlling transport in superconducting devices is often overlooked.
J. Linder and J. W. A. Robinson, Nat. Phys. ***11*** *, 307 (2015).*

6. Kalenkov *et al.* developed their model for long-range triplets in a ferromagnetic vortex using a two-dimensional (in-plane) magnetic pattern, while the out-of-plane magnetization of the vortex core appears to be of fundamental importance.
Kalenkov et al. , Phys. Rev. Lett., ***107****, 087003 (2013).*

7. The wide-spread assumption that the enhanced superconducting phase of Sr_2RuO_4 (the so-called 3 K-phase) has the same pairing symmetry as the intrinsic ($T_c = 1.5$ K) phase has surprisingly little basis, and is challenged by recent experiments.
Steppke et al. , Science ***355****, 6321 (2017).*

8. In their work on Sr_2RuO_4 rings, Cai *et al.* have wrongly attributed the large-amplitude magnetoresistance oscillations to vortex-crossing.
Cai et al. , Phys. Rev. B, ***87****, 8 (2013).*

9. There is immense potential in allowing those who are passionate about science, but lack the traditional training of a professional scientist, to join research teams and work on a project as a hobby.

Kaveh Lahabi
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