第 106 回トポロジカル物質科学セミナー
Topological Materials Science Seminar (106)

Anomalous Nonlocal Conductance as a Signature of Chiral *p*-wave Superconductivity

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Place: 名大東山キャンパス工学部 3 号館 273 号室
Date: October 7 (Monday), 2019
Time: 10 時半から 12 時

Abstract:

During the past two decades, chiral Majorana edge states appearing at the boundary of a spin-triplet chiral *p*-wave superconductor has attracted much attention. The perovskite superconductor Sr2RuO4 is the most promising candidate material for spin-triplet chiral *p*-wave superconductors [1]. At present, finding a conclusive signature of chiral Majorana edge states in this compound is an urgent issue in physics of topological phase of matter and that of spin-triplet superconductivity.

In this work, we demonstrate that the chiral nature of Majorana edge states is drastically manifested in nonlocal conductance in a junction consisting of a chiral *p*-wave superconductor and two ferromagnetic leads. The nonlocal conductance in the present junction is insensitive to the distance between the two leads and is sensitive to the chirality of the pair potential. These two drastic features enable us to identify the moving direction of the chiral Majorana edge states in the single experimental setup only by changing the lead wire to which the bias voltage is applied. We propose a smoking-gun experiment to identify the chiral *p*-wave superconductivity.

References

[1] Y. Maeno, S. Kittaka, T. Nomura, S. Yonezawa and K. Ishida, “Evaluation of Spin-Triplet Superconductivity in Sr_2RuO_4”, J. Phys. Soc. Jpn. 81, 011009 (2012).

[2]S. Ikegaya, Y. Asano, and D. Manske, “Anomalous Nonlocal Conductance as a Fingerprint of Chiral Majorana Edge States”, arXiv: 1901.07652

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