

CEA - Saclay 91191 Gif-sur-yvette Cedex
Service de Physique de l'Etat Condensé
SÉMINAIRE

Mercredi 8 février 11h15

Orme des Merisiers SPEC Salle Itzykson, Bât.774

Inducing odd-frequency triplet superconducting correlations in a normal metal strip

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Hybrid superconducting/ferromagnetic circuits can exhibit fascinating unconventional superconducting correlations. A conventional superconductor hosts Cooper pairs made out of two electrons correlated in a spin-singlet state. However, a ferromagnet contacted to a superconductor can contain triplet superconducting correlations. These correlations are related to those observed in exotic compounds like SrRuO₄. Synthesizing and controlling such correlations in artificial nanostructures is therefore an important goal.

When the ferromagnet has a non-homogeneous magnetization, two types of triplet superconducting correlations can appear: correlations with total spin 0 (between opposite spins) and correlations with total spin 1 (between equal spins). Triplet correlations with spin 0 have been observed a decade ago. However, indirect signatures of triplet correlations with spin 1 have been observed only recently.

In this talk, I will present a new geometry where triplet superconducting correlations would propagate inside a normal metal strip contacted to a superconductor and a ferromagnetic insulator [1]. I will use spin-dependent boundary conditions for isotropic superconducting Green's functions [2] to calculate the density of states inside the normal metal strip. This signal would provide a more direct characterization of superconducting correlations. In particular, it would enable an unambiguous characterization of triplet correlations with spin one.

[1] A. Cottet, Phys. Rev. Lett. 107, 177001 (2011).

[2] A. Cottet, D. Huertas-Hernando, W. Belzig, and Y. V. Nazarov, Phys. Rev. B 80, 184511 (2009).

A coffee break will be served at 11h00. The seminar will be given in English.