Chez Pierre

Presents ...

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"Topological aspects of Andreev bound state in superconductivity"

It is well know from the history of superconductivity, interference between electron and hole generates special bound state specifict to superconductivity so called Andreev bound state [1].
It is known that surface Andreev bound state is an important ingredient to identify unconventional superconductors [2]. Up to now, there have been several types of Andreev bound states stemming from their topological origins [3]. It can be classified into i)dispersionless flat band type realized in cuprate, ii)linear dispersion type realized in chiral superconductor like Sr2RuO4, iii)helical dispersion type realized in non-centrosymmetric superconductor and iv)cone type in the surface state on B-phase of superfluid 3He . The common feature in these systems is the presence of anisotropic pair potential changes sign on the Fermi surface.
On the other hand, current direction is to produce Andreev bound state using conventional spin-singlet pairing. One of the key point is the spin-orbit coupling to reduce the electron's degree of freedom [4]. For example, both in the presence of spin-orbit coupling and Zeeman field, since it is possible to generate spinless fermion system, the linear dispersion edge state is generated like chiral p-wave superconductor. In this talk we focus on i)superconductor / ferromagnet hetero structures on the topological insulator [5-6] , ii) evolution of edge states and critical phenomena in the Rashba superconductor with magnetization [7], iii)topological superconductivity in bilayer Rashba system [8], and iv)superconducting topological insulator [9-11].

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