

MAR11-2010-002545

Abstract for an Invited Paper
for the MAR11 Meeting of
the American Physical Society

Odd Triplet superconductivity in Superconductor-Ferromagnet hybrid structures

SEBASTIAN BERGERET, Centro de Fisica de Materiales CSIC/UPV and DIPC, San Sebastian

Since the prediction of a long-range triplet component of the superconducting condensate in ferromagnetic-superconductor (S/F) proximity structures in 2001 [1], the activity in the field has increased considerably, both theoretically and experimentally. The coexistence of conventional singlet superconductivity and ferromagnetism in S/F structures is closely related with the appearance of a triplet component of the condensate, which is odd in frequency and even in momentum and therefore insensitive to nonmagnetic impurities. The presence of the triplet component leads to new effects as for example, long-range Josephson coupling in SFS junctions [1], flow of a supercurrent through a half-metallic link [2] and screening of the magnetic moment of ferromagnetic particles embedded in a superconductor [3]. In this talk I will review the main issues of the odd-triplet superconductivity, its manifestation in physical properties, and briefly discuss the relevant experiments in the field [4].

[1] F.S. Bergeret, A. F. Volkov and K. B. Efetov, *Phys. Rev. Lett.* 86, 4096 (2001); see also by the same authors *Rev. Mod. Phys.* 77, 1321 (2005).

[2] M. Eschrig and T. Löfwander, *Nature Phys.* 4, 138 (2008).

[3] F. S. Bergeret, A. F. Volkov and K. B. Efetov, *Phys. Rev. B* 69, 174504 (2004).

[4] R. S. Keizer et al, *Nature* 439, 825 (2006); T. S. Khaire et al., *Phys. Rev. Lett.* 104, 137002 (2010); J. W. A. Robinson, J. D. S. Witt and M. G. Blamire, *Science* 329, 59 (2010), Jian Wang et al, *Nature Phys.* 6, 389 (2010).