

## Ordinary and Triplet Superconducting Spin Valve Effect in Fe/Pb Based Heterostructures

**Authors :** P. V. Leksin, A. A. Kamashev, N. N. Garifyanov, I. A. Garifullin, Ya. V. Fominov, J. Schumann, Y. Krupskaya, V. Kataev, O. G. Schmidt, B. Büchner

**Abstract :** We report on experimental evidence for the occurrence of the long range triplet correlations (LRTC) of the superconducting (SC) condensate in the spin-valve heterostructures CoOx/Fe1/Cu/Fe2/Pb. The LRTC generation in this layer sequence is accompanied by a Tc suppression near the orthogonal mutual orientation of the Fe1 and Fe2 layers' magnetization. This Tc drop reaches its maximum of 60mK at the Fe2 layer thickness  $d_{Fe2} = 0.6$  nm and falls down when  $d_{Fe2}$  is increased. The modification of the Fe/Pb interface by using a thin Cu intermediate layer between Fe and Pb layers reduces the SC transition width without preventing the interaction between Pb and Fe2 layers. The dependence of the SSVE magnitude on Fe1 layer thickness  $d_{Fe1}$  reveals maximum of the effect when  $d_{Fe1}$  and  $d_{Fe2}$  are equal and the  $d_{Fe2}$  value is minimal. Using the optimal Fe layers thicknesses and the intermediate Cu layer between Pb and Fe2 layer we realized almost full switching from normal to superconducting state due to SSVE.

**Keywords :** superconductivity, ferromagnetism, heterostructures, proximity effect

**Conference Title :** ICNOP 2015 : International Conference on Nanotechnology, Optoelectronics and Photonics

**Conference Location :** Stockholm, Sweden

**Conference Dates :** July 13-14, 2015