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Role of interface transparency and exchange field in the superconducting triplet spin-valve effect

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Abstract

© (2015) Trans Tech Publications, Switzerland. We study the superconducting transition temperature Tc of F2/F1/S trilayers (Fi is a metallic ferromagnet, S is a s-superconductor), where the long-range triplet superconducting component is generated at canted magnetizations of the F layers. In this paper we show that it is possible to realize different spin-valve effect modes - the standard switching effect, the triplet spin-valve effect, reentrant Tc(α) dependence or reentrant Tc(α) dependence with the inverse switching effect - by variation of the F2/F1 interface transparency or the exchange splitting energy. In addition, we show that position of the Tc minimum can be changed by joint variation of the F2/F1 interface transparency and the layer thicknesses.

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Keywords

Exchange splitting energy, Ferromagnetic, Interface transparency, Magnetization, Proximity effect, Superconducting, Transition temperature, Triplet spin-valve