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Basic Superconducting Spin Valves

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Abstract

The short review is devoted to the state of the art of a booming field of research in spintronics—superconducting spintronics. The spin valve properties of hybrid structures consisting of alternating layers of superconductor (S) and ferromagnetic (F) of nanoscale thicknesses and superconducting due to the proximity effect are considered in detail. The experimental data for the weak and strong ferromagnetic materials are analyzed; the role of the domain structure of the ferromagnet and the scattering of electrons with spin flip at the SF interfaces in the magnitude of the valve effect is considered. Theoretical works describing the effects of the spin valve for diffusive and clean limits are analyzed. The necessity of consideration of the multiplicity of configurations of the superconducting order parameter in multilayer SF heterostructures is underlined.