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π-phase magnetism in ferromagnet-superconductor superlattices

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Abstract

New 0π and ππ Larkin-Ovchinnikov-Fulde-Ferrell (LOFF) states with antiferromagnetic orientation of magnetizations in the neighboring layers of a ferromagnetic metal (FM) are predicted for FM/superconductor (FM/S) superlattices. Under certain conditions, the critical temperature Tc of these states is higher than for the known 00 and π0 LOFF states with ferromagnetic ordering of the FM layers. It is shown that the nonmonotonic behavior of Tc in the FM/S superlattices with S-layer thickness ds less than the threshold value dπ s is due to the phase transition cascade 0π-ππ-0π. At ds > dπ s, the Tc oscillations are caused by the 00-π0-00 transitions. New logic elements based on the FM/S structures and combining the advantages of the superconducting and magnetic data-record channels in a single sample are proposed. © 2001 MAIK "Nauka/Interperiodica".

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