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Multicritical behavior of the phase diagrams of ferromagnet/superconductor layered structures

Izyumov Y., Proshin Y., Khusainov M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

For ferromagnet/superconductor (F/S) layered structures, new 3D Larkin-Ovchinnikov-Fulde-Ferrell (LOFF) states are predicted. In most cases, these states are characterized by a higher critical temperature Tc than the known 1D LOFF states. It is shown that the nonmonotonic behavior of Tc is determined by the oscillations of the Cooper pair flux through the F/S boundary, which occur as a result of the 3D-1D-3D phase transitions at the Lifshits triple points. The appearance of the new 3D LOFF states and the presence of nonmagnetic impurities leads to a strong damping of the 1D oscillations of the LOFF pair amplitude and to a considerable smoothing of the dependence of Tc on the F layer thickness df. An interpretation of the behavior of the experimental dependences Tc(df) obtained for F/S structures is proposed. © 2000 MAIK "Nauka/Interperiodica".