1. Abstract
The proximity effect for thin pure bilayer F/S and trilayer F/S/F, where F is ferromagnetic metal, and S is superconductor, is investigated on the base of new boundary-value problem for the Eilenberger function. For both systems the dependencies of critical temperature on an exchange field of the F metal, electronic correlations in the S and F metals, and thicknesses of layers F and S are derived. It is shown that the possibility of the Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state observation is especially increased in the asymmetrical trilayers F/S/F' for which solitonic reentrant superconductivity is predicted. We propose new method of probe of electronic correlations and exchange field. It allows us to predict the sign and value of the constant of electron-electron interaction in gadolinium and explain a surprisingly high critical temperature (Tc ~ 5K) in the short-periodic Gd/La superlattice.

2. Experimental background


4. Critical temperature Tc(d')
We propose the same electronic structure of metals v, w, x, y, and the transverse FFLO momenta q, a, b, and c. The energy gap can be found numerically as a function of d'.

5. Conclusions
The solitary reentrant superconductivity in the asymmetrical F/S/F' trilayer is predicted and the Gd/La/Gd trilayer is proposed to observe this effect (Figs. 1-3). The asymmetrical F/S/F' trilayer is the real candidate to observe the FFLO-BCS-FFLO competition (Fig. 3). The surprisingly high Tc in the short-period Gd/La superlattice is explained and the value of the constant of el-el. attraction in gadolinium is predicted. The asymmetrical F/S/F' trilayer is predicted in case of the el-el. repulsion into the F layers (Fig. 2). The method of supercond. probing spectroscopy to detect unknown electronic parameters of F metals is proposed.