

Solid State Phenomena, 2009, vol.152-153, pages 457-461

---

## Proximity effect as a probe of electronic correlations and exchange field in dirty ferromagnet/superconductor nanostructures

Terentieva L., Parfenova E., Khusainov M., Proshin Y.  
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

---

### Abstract

© (2009) Trans Tech Publications, Switzerland. We investigate the interplay between the BCS and 2D Larkin-Ovchinnikov-Fulde-Ferrell (LOFF) states in the dirty thin ferromagnetic metal/superconductor (FM/S) nanostructures. For the FM/S bilayers we have derived the dependencies of critical temperature on the FM layer exchange field, electronic correlations and thickness. Moreover, in the corresponding FM/S/FM trilayers we predict two new  $\pi$  phase superconducting states with electron-electron repulsion in the FM layers. The 2D modulated LOFF states are possible in such trilayers only in presence of a weak magnetic field and at suitable parameters of the FM and S layers. On this base we originally propose the method of proximity effect probe the magnitude and sign of the electronic correlations, the order parameter symmetry and exchange fields in various FM layers.

<http://dx.doi.org/10.4028/www.scientific.net/SSP.152-153.457>

---

### Keywords

Boundary value problem, Electronic correlations, Ferromagnetism, Mutual accommodation, Proximity effect, Superconductivity