NEGATIVE MAGNETORESISTANCE OF LAYERED HTSC COMPOUNDS

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9.7 cm

Magnetoresistance (MR) of layered high-T_c systems with quasi-two- dimensional superconductivity in magnetic field applied parallel to superconducting (S) planes has been investigated theoretically. In such configuration an increase of the magnetic field H value decreases the critical temperature of S regions [1]. It causes both a suppression of S gap parameter and an increase of tunnel current between the S planes and, consequently, leads to negative MR. MR dependence on H has been calculated for different values of ratio between S layer thickness d_S and the normal layer thickness d_N. It is found that in the $d_S \lesssim d_N$ case there exists a region on the H-T phase diagram where MR is positive. In the opposite case ($d_S \gg d_N$) MR is negative anywhere on the H-T diagram. These results can be used also for analysis of current-voltage characteristics of both S-I-S and S-I-N tunnel junctions.

[1] V.N.Varyukhin, G.G.Levchenko, Yu.V.Medvedev, A.V.Pashchenko, and S.J.Lewandowski, Low Temp. Phys. 24, 234 (1998).

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