MAGNETIC FIELD BEHAVIOUR OF SUPERCONDUCTING HETEROSTRUCTURES WITH ANTIFERROMAGNETIC LAYER.

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A critical currents $I_C$ versus magnetic field $H$ for Nb/Au/Ca$_{0.5}$Sr$_{0.5}$CuO$_2$/YBa$_2$Cu$_3$O$_7$ heterostructures (GSA) with antiferromagnetic thin film layer (A) of Ca$_{0.5}$Sr$_{0.5}$CuO$_2$ 20 ÷ 50 nm in thickness were measured. It were compared with $I_C(H)$ dependencies for Nb/Au/YBa$_2$Cu$_3$O$_7$ Josephson junctions, which were made by similar technique and with the same sizes from 10-10 $\mu$m$^2$ to 50-50 $\mu$m$^2$. According to [1] GSA structures should have magnetic oscillations of $I_C$, which are much smaller in period, than period of $I_C(H)$ for SNS junctions, in case of A layer is thicker than coherence length. In figure 1 half widths of the main peak $\Delta H$ in dependency $I_C(H)$ are compared for GSA and for the junctions.

The $\Delta H$ fields for GSA with 50 nm Ca$_{0.5}$Sr$_{0.5}$CuO$_2$ layer (closed circles) were 25 times smaller, than the fields for junctions, which have no A layer (open circles). $\Delta H$ fields were inversely proportional to structure width $L$ in both cases (solid lines). Sensitivity to magnetic field 2mV/G was obtained for 20-20 $\mu$m$^2$ heterostructure.


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