PROXIMITY EFFECT IN HIGH-T_c SUPERCONDUCTORS

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Depletion of oxygen in surface layer of oxide superconductor reduces the density of states (DOS) measured in tunneling experiments [1]. We suppose that thin nonsuperconducting layer is superimposed on bulk superconductor, and solve matrix equation

$$v F \frac{\partial}{\partial r} \hat{G} - i\varepsilon \, [\hat{\tau}_3 , \hat{G}]_- = i \, [\hat{G}, \hat{\Sigma}]_-$$

for quasiclassical Green function $\hat{G}(p,r,\varepsilon)$. The self-energy $\hat{\Sigma}$ is determined in selfconsistent way. DOS at the surface is obtained as $N(\varepsilon) = \mathrm{Re} \int d(\cos\theta) G_{11}$ at $z = 0$. Phonon features show up in DOS and are calculated by solving Eliashberg equation in the model of strong electron-phonon interaction combined with direct electron–electron coupling [2]. $\Delta(T, \lambda_{ph})$ and $2\Delta(0)/T_c(\lambda_{ph})$ dependencies are calculated within the model.

1. *Di Chiara A., Fontana F., Peluso G.,Tafuri F.*, J. of Supercond. **4**, 35 (1991).
2. *Omelyanchouk A. N., Kulik I. O.*, Sov. J. Low Temp. Phys. **16**, 656 (1990).