RESISTIVE STATE OF HTSC

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It is known that I—V characteristic (IVC) of conventional superconductors has the form:

$$E = \frac{\Phi_o H}{\eta} (j - j_c), \tag{1}$$

where j and j_c are current and critical current, E is electric field, H is external magnetic field, Φ_0 is the flux quantum and η is viscosity of the vortex lattice. In particular the IVC slope is proportional to external magnetic field. However for HTSC in the case of low-field electrodynamics the situation is quite different. IVCs in this case are retained parallel to themselves under considerable changes of the magnetic field. It is inconsistent with eq. (1).

In this paper we show that the formula describing IVC is, as a matter of fact, more complicated tha eq.(1) which is valid only asymptotically. The asymptotic conditions are practically always fulfilled for the conventional superconductors. But in the HTSC lowfield electrodynamics the important region of parameters is always far from asymptotical one and eq.(1) is invalid. Finally, we are analyzing the obtained formula for IVC in simple limiting cases.