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PECULIARITIES OF THE RELAXATION OF FLUCTUATIONS IN TWO-COMPONENT SUPERCONDUCTORS

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Multi-component superconductivity models include rather varied physics. In connection with the presence of interacting order parameters the superconducting ordering, kinetics, and fluctuation properties of multi-band systems are quite different from the corresponding characteristics in one-band superconductors. The examination of these peculiarities has been an object of growing interest.

In the present contribution we investigate the damping of fluctuations of order parameters in a two-band model of superconductivity in dependence on intra- and interband interactions. The relevant free energy and kinetic equations have been derived. On the basis of these equations one can distinguish two different time scales in the damping of superconducting fluctuations in a two-band scenario. The formation of such relaxation channels is caused by the interband interaction leading to the redistribution of damping processes of the initially independent bands. The relaxation times obtained here characterize the kinetics of critical and non-critical fluctuations which appear as the linear combinations of the deviations from the equilibrium band superconducting orders. The non-monotonic temperature dependence of the relaxation times has been established below the phase transition point. The behavior is caused by the certain competition between intra- and interband couplings. We suppose that this peculiarity of relaxation dynamics may be of relevance for the interpretation of experimental data in copper-oxide high-T_C compounds [1,2,3] and in magnesium diboride [4,5].

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