Applicability of two-component Ginzburg-Landau model in two-band systems[1] MIHAIL SILAEV, Royal Institute of Technology and Institute for physics of microstructures RAS, EGOR BABAEV, Royal Institute of Technology and University of Massachusetts Amherst — We report a microscopic derivation of the conditions under which the two-band superconductors can be described by a two-component Ginzburg-Landau (GL) field theory. We also investigate the conditions when multicomponent GL-like expansions fail and one should resort to a microscopic description. We show that besides being directly applicable at elevated temperatures, a version of a minimal two-component GL theory in certain cases also gives an unexpectedly accurate description of certain aspects of a two-band system even substantially far from T_c. This shows that two-component GL model can be used for addressing a wide range of questions in multiband systems.

Mihail Silaev
Royal Institute of Technology and Institute for
physics of microstructures RAS

Date submitted: 07 Nov 2011   Electronic form version 1.4