# ANISOTROPY OF SUPERCONDUCTING STATE PROPERTIES IN CUPRATES, $MgB_2$, AND PNICTIDES

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In the anisotropic Ginzburg-Landau theory, which is the most commonly applied phenomenological description of layered superconductors, the anisotropy is described by the temperature independent effective mass anisotropy (assuming $(m_i^*/m_j^*)^{1/2} = \lambda_i/\lambda_j = H_{c2}^{\|j}/H_{c2}^{\|i}$, where $\lambda$ is penetration depth and $H_{c2}$ is upper critical field). However, a temperature dependent anisotropy was observed in some superconductors, especially in $MgB_2$, and was explained as a consequence of the presence of two superconducting gaps. A similar temperature dependence was also observed in recently discovered iron-based superconductors, in which an evidence for two-band superconductivity was provided by several experiments, including point contact spectroscopy and ARPES. A recent study of the cuprate superconductor $SmBa_2Cu_3O_{7-\delta}$ has shown that the temperature dependence of the anisotropy is observed also for this class of the layered high-$T_c$ superconductors. Temperature variation of the anisotropy strongly depends on the doping level and is more pronounced for the samples with lower oxygen content, i.e., for the samples with well developed pseudogap. This rises the question whether the temperature dependence of the anisotropy is a common property of all layered high-$T_c$ superconductors and how it is linked to the gap structure.