Evolution of the Paring Symmetry by the Doping Change in n-type Superconductors

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According to the resistivity method the temperature dependences of the upper critical field of electron-doped superconductor $Nd_{2-x}Ce_xCuO_{4+\delta}$ single-crystal films with various Ce concentration (x =0.15, 0.17, 0.18 and different degree of disorder δ were studied in magnetic fields up to 12T ($B \parallel c$, $J \parallel ab$) and temperature range 0.4-40 K.
We have found the crucial difference between the behaviors of the upper critical field slope $(dH_{c2}/dT)|_{T_c}$ and critical temperature T_c/T_{c0} as the function of the disorder parameter for optimally doped (x =0.15) and overdoped films (x =0.17 and 0.18). Experimentally observed behaviors corresponds to theoretical predictions for d-wave (x =0.15) or anisotropic s-wave (x =0.17; 0.18) superconductors. We have demonstrated that the relative stability of the optimal doped n-type superconductor with the d-paring with regard to disordering is assotiated with the strong anisotropy of d-type impurity scattering. Present result points to possible change of the pairing symmetry: from optimally doped superconductors with d-pairing to overdoped anisotropic s-pairing superconductors.
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