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Superconductive density-of-states (DOS) depletion effect manifested in interlayer magnetotransport of overdoped Bi-2212[1] TOMOHIRO USUI, SHINTARO ADACHI, YUKI TERAMOTO, Hirosaki Univ., ITSUHIRO KAKEYA, Kyoto Univ., AKIHIRO KONDO, KOICHI KINDO, ISSP, Univ. of Tokyo, SHOJIRO KIMURA, Tohoku Univ., TAKAO WATANABE, Hirosaki Univ.
— To determine the mechanism of high superconducting transition temperature (high-T_c) superconductivity, we must understand the relationship between the pseudogap (PG) and superconductivity. For this purpose, we measure the out-of-plane resistivity ρ_c (T, H) of an overdoped $Bi_{1.6}Pb_{0.4}Sr_2CaCu_{1.96}Fe_{0.04}O_{8+\delta}$ (Bi-2212) single crystal under pulsed magnetic fields up to 60 T. Above T_c, magnetoconductivity (MC) is due to two positive components: one component rapidly increases with increasing fields but saturates at higher fields, and the other component gradually increases as H^2. The former decreases with increasing temperature and vanishes around the onset temperature of superconductive fluctuation T_{scf}. Thus, it is attributed to the superconductive DOS depletion effect. The latter is present both below and above T_{scf}. Thus, it is attributed to the PG effect. Subsequent analysis below T_c shows that the peak structure for $\rho_c(T, H)$ is primarily due to the superconductive DOS depletion effect. This result supports the scenario that the PG results in high-T_c superconductivity.

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