Upper critical field in electron-doped Pr$_{2-x}$Ce$_x$CuO$_{4-\delta}$ in parallel magnetic fields

PENGCHENG LI, Center for Superconductivity Research and Department of Physics, University of Maryland, College Park, MD 20742, F.F. BALAKIREV, NHMFL-LANL, Los Alamos, NM 87545, R.L. GREENE, Center for Superconductivity Research and Department of Physics, University of Maryland, College Park, MD 20742 — We report a comprehensive study of the resistive superconducting transition in the electron-doped Pr$_{2-x}$Ce$_x$CuO$_{4-\delta}$ films down to 1.5K for magnetic field up to 58T applied parallel to the conducting ab-planes. We find that the parallel critical field ($H_{c2//ab}$) exceeds 58T for underdoped and optimally doped films. For the overdoped films, 58T is sufficient to suppress the superconductivity. An $H_{c2//ab}$ - T phase diagram is established. A comparison between our experimental results and theories for orbital and spin pairbreaking effects will be presented.

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