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Hysteresis and memory in the magnetoresistance of underdoped $La_{2-x}Sr_xCuO_4$ thin films[1] X. SHI, D. POPOVIĆ, Dept. of Phys. & Natl. High Magnetic Field Lab., Florida State Univ., C. PANAGOPOULOS, Dept. of Phys., Univ. of Crete and FORTH & Div. of Phys. and Appl. Phys., Nanyang Tech. Univ., G. LOGVENOV, A. BOLLINGER, I. BOZOVIC, Brookhaven Natl. Lab. — We have studied the in-plane magnetoresistance (MR) in atomically smooth, MBE grown $La_{2-x}Sr_xCuO_4$ thin films with $x = 0.03$, 0.05, 0.055, and 0.06. These dopings span the region from non-superconducting to superconducting samples. The MR was measured at temperatures 0.3 K $\leq T \leq$ 20 K and in magnetic fields 0 $\leq$ B $\leq$ 9 T, applied both parallel and perpendicular to the c-axis. At low T, the MR shows the emergence of a strong, positive contribution, which exhibits hysteresis and memory. At the same time, the zero-field resistances obtained after field cooling and zero-field cooling are found to be different. These glassy features, which seem to reflect the slow dynamics of holes, become more pronounced as T is reduced. The evolution of this glassy, low-T state with doping is discussed in detail.

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