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Spin-orbit interaction in Kondo regime of δ-doped $LaTiO_3/SrTiO_3$ interface SHUBHANKAR DAS, A. RASTOGI, Z. HOSSAIN, Indian Institute of Technology, Kanpur, R.C. BUDHANI, Indian Institute of Technology, Kanpur and National Physical Laboratory, New Delhi — The formation of a 2-dimensional electron gas (2DEG) at the interface of $LaTiO_3/SrTiO_3$ (LTO/STO) has evoked a keen interest in the condensed matter physics community due to the observation of many collective electronic phenomena in the 2DEG. In order to address some puzzling issues related to the mechanism of 2DEG formation at the LTO/STO interface and to identify the dominant scattering process that control the nature of Magnetoresistance (MR) in this system, we have used a novel approach of delta (δ) doping with iso-structural perovskite $LaCrO_3$ at the interface, which dramatically alters the properties of 2DEG. We have observed a reduction in the sheet carrier density with doping thickness, prominence of the resistivity upturn at low temperatures seen in LTO/STO 2DEG, shift of resistivity minimum towards higher temperature, enhancement of weak anti-localization (WAL) below 10K and strong anisotropic magnetoresistance. The observed in-plane MR is attributed to Kondo-type scattering by localized Ti^{3+} moments which gets normalized by spin-orbit interaction at $T < 10K$. With increasing the Cr^{3+} ions concentration at the interface, WAL effect becomes more prominent below 10K.

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