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Anomalous Hall Effect in Superparamagnetic Co-(La,Sr)TiO_3 Thin Films SHIXIONG ZHANG, WEIQIANG YU, SATISH B. OGALE, SANJAY R. SHINDE, DARSHAN C. KUNDALIYA, JOSHUA S. HIGGINS, RANJAN SAHU, RICHARD L. GREENE, THIRUMALAI VENKATESAN, Center for Superconductivity Research, Department of Physics, University of Maryland, College Park, WANGKONG TSE, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, SHENGYU YOUNG, LOURDES G. SALAMANCA-RIBA, Department of Materials Science and Engineering, University of Maryland, College Park — We performed a systematic study of the magnetic properties and the Hall effect on 5% cobalt doped (La, Sr)TiO_3thin films grown by pulsed laser deposition. The superparamagnetic nature of the system is established by several protocols of magnetic measurements. Nevertheless, the anomalous Hall effect (AHE) is observed in the system, the Hall resistivity vs magnetic field loops being found to be identical to the magnetic hysterisis loops. This once again (Phys. Rev. Lett. 92, 166601 (2004)) highlights the limitations of AHE as a tool to test the intrinsic nature of ferromagnetism in a diluted magnetic system. Possible reasons for the origin of the AHE in our system are discussed.

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