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Dynamical behavior of spins in $\mathbf{La_{1-x}Sr_xCoO_3}$ ROBERT SMITH, MICHAEL HOCH, WILLIAM MOULTON, PHILIP KUHNS, ARNEIL REYES, GREG BOEBINGER, NHMFL/FSU, JOHN MITCHELL, ANL — The thermally induced spin state transition of Co^{3+} ions in the cobaltite $LaCoO_3$, found at temperatures in the range 30 to 120 K, has been the subject of extensive experimental and theoretical investigation. Much less is known about the spin state transition in hole-doped $La_{1-x}Sr_xCoO_3$ (LSCO). Phase diagrams for the doped material, that are based on available experimental evidence, show low temperature (4 K) conversion of the majority of Co^{3+} ions from low spin to intermediate spin states. It has been suggested that a low temperature transition is induced in LSCO for all $x > 0.02$, by lattice relaxation effects. However, the present ^{139}La NMR experiments have provided information on the spin state transition in hole-poor regions of the nanoscale phase separated material which shows that the thermally induced transition remains important in these regions for x approaching the metal-insulator critical concentration $x_C = 0.17$. The finding should be taken into account in investigation of the magnetoelectronic properties of LSCO.

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