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Field Effect on Spin Correlations in $La_{1-x}Sr_xCoO_3$ DANIEL PHELAN, National Institute of Standards and Technology, DESPINA LOUCA, SEUNGHUN LEE, University of Virginia, STINE ANCONA, STEPHAN ROSENKRANZ, JOHN MITCHELL, Argonne National Laboratory — $La_{1-x}Sr_xCoO_3$ evolves from a non-magnetic, insulating ground state in the parent compound (x=0) into a metallic, ferromagnetic cluster-glass (x>0.18). For intermediate concentrations, the ground state is characterized by a competition between ferromagnetic and incommensurate spin correlations, which leads to short-range clustering. The field effect on these competing spin correlations has been investigated by neutron diffraction from a single crystal of $La_{.85}Sr_{.15}CoO_3$ under an externally applied vertical magnetic field ranging from 0 to 7 T. The intensity of the incommensurate reflections is signficantly reduced under 7 T. On the other hand, the ferromagnetic signal is enhanced by more than an order of magnitude under 7 T, while simultaneously narrowing in reciprocal space, implying an increase in the correlation length, which cannot be understood simply by a reorientation of ferromagnetic clusters along the direction of the applied field. Instead, the data is interpreted in a phase-separated scenario in which the applied field polarizes regions which are initially not ferromagnetic in zero field.

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