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Paramagnetic Spin Correlations in Colossal Magnetoresistive $La_{0.7}Ca_{0.3}MnO_3$ JEFFREY LYNN, JOEL HELTON, NCNR, National Institute of Standards and Technology, MATTHEW STONE, Oak Ridge National Laboratory, DMITRY SHULYATEV, YAKOV MUKOVSKII, Moscow State Steel and Alloys Institute — Inelastic neutron scattering measurements, taken on the ARCS time-of-flight spectrometer, reveal dynamic spin correlations throughout the Brillouin zone in the colossal magnetoresistive system $La_{0.7}Ca_{0.3}MnO_3$ at 265 K ($\approx$1.03 T_C). Well defined correlations are observed in constant-E scans. The long-wavelength behavior can be attributed to spin diffusion, qualitatively consistent with dynamical scaling theory, with a correlation length of $\approx$10 Å. Dynamic correlations are observed at energies up to at least 28 meV, suggesting persistent short range spin correlations in the paramagnetic phase. An additional and unexpected component of the scattering is observed at lower energies which takes the form of ridges of strong scattering running along (H 0 0) and equivalent directions.

Jeffrey Lynn
NCNR, National Institute of Standards and Technology

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