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Anomalous nuclear relaxation in the ferromagnetic phase of the bilayered manganite $La_{1.2}Sr_{1.8}Mn_2O_7$. MICHAEL HOCH, PHILIP KUHNS, WILLIAM MOULTON, ARNEIL REYES, JUN LU, National High Magnetic Field Laboratory, 1800 E. Paul Dirac Dr., Tallahassee, FL 32310, JOHN MITCHELL, Argonne National Laboratory, Argonne, IL 60439 — In contrast to ferromagnetic (FM) 3D manganites, ^{55}Mn NMR spectra obtained for the FM phase of the colossal magnetoresistance bilayer manganite $La_{1.2}Sr_{1.8}Mn_2O_7$ show a broad distribution of hyperfine fields implying a large distribution of local environments at Mn sites. The hyperfine distribution may be linked to orbital ordering effects. ^{55}Mn spin – lattice relaxation rates have a surprisingly weak dependence both on temperature and applied magnetic field. Significant departures of the relaxation rate from Korringa temperature dependence below 20 K provide evidence for non-Fermi liquid behavior in this quasi-2D metal. At temperatures approaching T_C from below, further anomalous behavior is found consistent with spin polaron formation in the range where colossal magnetoresistance starts to appear.

Michael Hoch
National High Magnetic Field Laboratory,
1800 E. Paul Dirac Dr. Tallahassee, FL 32310

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