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Signature of Magnetic Phase Separation in $\mathbf{Pr_{1-x}Ca_xMnO_3}$.[1] DALGIS MESA, HAO SHA, JIANDI ZHANG, Florida International University, Miami, FL 33199, F. YE, Oak Ridge National Laboratory, Oak Ridge, TN 37831, P.C. DAI, J. A. FERNANDEZ-BACA, University of Tennessee, Knoxville, TN 37996;Oak Ridge National Laboratory, Oak Ridge, TN 37831, J. W. LYNN, NIST Center of Neutron Research, Gaithersburg, MD 20899, Y. TOMIOKA, Correlated Electron Research Center, Tsukuba 305-0046, Japan, Y. TOKURA, University of Tokyo, Tokyo 113-8656, Japan — Elastic neutron scattering has been used to study the evolution of the long-/short-range charge-orbital (CO-OO), ferromagnetic (FM), and antiferromagnetic (AF) correlations in the single crystals $Pr_{1-x}Ca_xMnO_3$ (x = 0.3, 0.35 and 0.4). In contrast with $Pr_{0.7}Ca_{0.3}MnO_3$ (PCMO30), both the long-range CO-OO and AF ordering show precipitous decrease in intensity below 30K, where the short-range FM clusters are formed in the $Pr_{0.65}Ca_{0.35}MnO_3$ (PCMO35). Those results provide clear evidence of magnetic phase separation. The doping dependence results of the short-range magnetic correlations indicate that there is a critical doping x_{cr} (close to $x = 0.35$) for the existence of phase separation in the CO-OO ground state.

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