

Abstract Submitted
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Spin and Lattice excitations in Ferromagnetic Insulating Manganites¹ DALGIS MESA, JIANDI ZHANG, Dept. of Physics, Louisiana State University, Baton Rouge, LA 70802, USA, JAIME FERNANDEZ-BACA, FENG YE, MARK HAGEN, Neutron Scattering Science Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA, T. TOMIOKA, YOSHINORI TOKURA, National Institute of Advanced Industrial Science and Technology (AIST), Japan — Though double-exchange interaction has been recognized as a major driving force for the couple magnetic and electronic phase transition, the nature of insulating ground state with ferromagnetic ordering in low-doping manganites is still not fully understood. Here we report on an inelastic neutron scattering study of spin and lattice excitations in the ferromagnetic insulating (FMI) phase of $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ with $x(\text{Ca}) = 0.2$. Dispersion relations for both phonons and spin waves along high-symmetry directions were obtained for temperatures of 5 and 225 K, respectively. At low temperatures, our results indicate an anomalous softening and broadening of the magnons near the zone boundary, especially when the magnon energy $E \sim 20$ meV, where a longitudinal optical phonon is present. Additional phonon and magnon branches observed will also be discussed.

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