

Abstract Submitted
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Lattice Dynamics and Magnetoelastic Coupling in a Frustrated Shape Memory Alloy PAUL STONAHA, MIKE MANLEY, Oak Ridge National Lab, NICK BRUNO, IBRAHIM KARAMAN, RAYMUNDO ARROYAVE, Texas AM University, NAVDEEP SINGH, University of Houston, ELIOT SPECHT, DOUG ABERNATHY, SONGXUE CHI, XIAOPING WANG, Oak Ridge National Lab, CRYSTAL FABRICATION TEAM, SCATTERING EXPERIMENTS TEAM, THEORY TEAM — Magnetocaloric (MC) materials present an avenue for chemical-free, solid state refrigeration through cooling via adiabatic demagnetization. We have used inelastic neutron scattering to measure the lattice dynamics in the MC shape memory alloy $\text{Ni}_{45}\text{Co}_5\text{Mn}_{36.6}\text{In}_{13.4}$. In this presentation, we present the results of inelastic neutron scattering near the Curie temperature. We find that there is an unaccounted-for change in phonon entropy of $0.22 \text{ kB atom}^{-1}$ ($26 \text{ J kg}^{-1} \text{ K}^{-1}$), which we attribute to phonon-magnon coupling. We identify an anomalous softening of the TA[100] phonon mode. We also present the results of diffuse neutron and X-ray diffraction experiments and provide an interpretation on the implied local order.

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