

Abstract Submitted
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Phonon spectrum of SrFe₂As₂ determined using multizone phonon refinement D. PARSHALL, Univ of Colorado, Boulder, R. HEID, Karlsruhe Institute of Technology, J.L. NIEDZIELA, Oak Ridge National Laboratory, TH. WOLF, Karlsruhe Institute of Technology, M.B. STONE, D.L. ABERNATHY, Oak Ridge National Laboratory, D. REZNIK, Univ of Colorado, Boulder — The ferropnictide superconductors exhibit a sensitive interplay between the lattice and magnetic degrees of freedom, including a number of phonon modes are much softer than predicted by nonmagnetic calculations using density functional theory (DFT). However, it is not known what effect, if any, the long-range magnetic order has on phonon frequencies above 23 meV, where several phonon branches are very closely spaced in energy and it is challenging to isolate them from each other. We measured these phonons using inelastic time-of-flight neutron scattering in ≈ 40 Brillouin zones, and developed a technique to determine their frequencies. We find this method capable of determining phonon energies to better than 0.1 meV accuracy, and that the DFT calculations using the experimental structure yield qualitatively correct energies and eigenvectors. We do not find any effect of the magnetic transition on these phonons.

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