Abstract Submitted
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Phonon Anharmonicity in PbTe Thermoelectrics[1] OLIVIER DELAIRE, JIE MA, KAROL MARTY, ANDREW MAY, MICHAEL MCGUIRE, MAO-HUA DU, DAVID SINGH, ANDREY PODLESNYAK, GEORG EHLERS, MARK LUMSDEN, BRIAN SALES, Oak Ridge National Laboratory — Achieving high thermoelectric conversion efficiency requires limiting the thermal conductivity, through the disruption of phonon propagation. A detailed understanding of phonon dispersions and linewidths is thus critical to develop accurate microscopic theories of thermal conductivity, and design efficient thermoelectric materials. We investigate the phonon dispersions and linewidths in the thermoelectric material PbTe with inelastic neutron scattering experiments. Our measurements indicate that the soft transverse optic mode in PbTe is strongly anharmonic, which could cause a lowering of thermal conductivity by scattering the heat-conducting acoustic modes [1]. We also present results on the effect of alloying.

[1] O. Delaire et al., Nature Materials 10, 614 (2011).

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