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**Phonons in nickel and aluminum at elevated temperatures from neutron scattering** MAX KRESCH, OLIVIER DELAIRE, Caltech, REBECCA STEVENS, JIAO LIN, BRENT FULTZ, Caltech — Measurements of the neutron scattering from elemental nickel were made at 10 K, 300 K, 575 K, 875 K and 1275 K, and from elemental aluminum at 10 K, 150 K, 300 K, 525 K and 775 K. From the scattering, the phonon densities-of-states (DOS) were calculated, and subsequently fit to Born von Kármán models of the lattice dynamics. Comparing to previous measurements of thermal expansion, and elastic moduli, we found a small, negative anharmonic contribution to the entropy in both cases. For nickel, we used this to place new bounds on the high temperature magnetic entropy. In both metals, the DOS displayed significant broadening at elevated temperatures. This anharmonic broadening was quantified, and shown to increase approximately as  $T^2$ .

Max Kresch  
Caltech

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