

Abstract Submitted
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Phonon Anomalies in α -uranium¹ XIAODONG YANG, PETER RISEBOROUGH, Temple University — The temperature-dependence of the phonon spectrum of α - uranium has recently been measured by Manley *et al.* [1] using inelastic neutron scattering and x-ray scattering techniques. Although there is scant evidence of anharmonic interactions, the phonons were reported to show some softening of the optic modes at the zone boundary. The same group of authors later reported that an extra mode was observed to form at a temperature above 450 K [2]. The existence of the proposed new mode is inconsistent with the usual theory of harmonic phonons, as applied to a structure composed of a monoclinic Bravais lattice with a two-atom basis. We investigate the effect that the f electron-phonon interaction has on the phonon spectrum and its role on the possible formation of a breathing mode of mixed electronic and phonon character.

[1] Manley *et al.* *Phys. Rev. Lett.* **86**, 3076 (2001).

[2] Manley *et al.* *Phys. Rev. Lett.* **96**, 125501 (2006).

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