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Phonon-stabilized electron distributions in uranium MICHAEL MANLEY, ROLAND SCHULZE, CYRIL OPEIL, ROBERT HANRAHAN, JAMES SMITH, Los Alamos National Laboratory — Contrary to prevailing thinking, recent phonon measurements indicate that thermal electronic excitations may cause a thermodynamically significant softening of phonons in several actinides. A corollary of this effect is that these electronic excitations should be stabilized to higher energies by the entropy generated by phonon softening. Evidence in photoemission spectra will be presented that confirms this for alpha-uranium. While the overall electronic structure is unaffected by heating, electron distributions near the Fermi edge show a large temperature-dependent enhancement in good agreement with phonon-stabilized electron distributions predicted from phonon softening data.

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