Stability Constraints and Local Criteria for the Bounds on T_c of Conventional Superconductors[1] JONATHAN E. MOUSSA, MARVIN L. CO-HEN, University of California at Berkeley and Lawrence Berkeley National Laboratory — In the regime of weak electron-phonon coupling, the scale of and bounds on T_c are set by the real phonon frequencies of a material. In the strong coupling limit of Eliashberg theory, the phonon frequencies no longer limit the transition temperature because T_c can grow without bound as $\sim \sqrt{\lambda}\omega_{ph}$, where λ is the electron-phonon coupling parameter. However, structural stability of the system puts bounds on T_c even in the strongly coupled regime due to the softening of phonons. In this case, T_c is also bounded by an averaged un-renormalized phonon frequency defined for a non-metallic precursor material. Additional features of this model will also be discussed.

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