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Momentum dependence of the electron-phonon coupling, phonon-induced pairing interaction, and self-energy effects in $YBa_2Cu_3O_7$ within the local density approximation ROLF HEID, KLAUS-PETER BOHNEN, Forschungszentrum Karlsruhe, IFP, Germany, DIRK MANSKE, ROLAND ZEYHER, Max-Planck-Institut for Solid State Physics, Stuttgart, Germany — Using the local density approximation (LDA) and a realistic phonon spectrum we calculate the momentum and frequency dependence of the electron-phonon coupling in $YBa_2Cu_3O_7$ and determine its consequences for the phonon-induced pairing interaction and for the electronic self-energy in the normal state. The phonon-induced interaction has a pronounced peak for large momentum transfers and the interband contributions between bonding and antibonding band are of the same magnitude as the intraband ones. The dimensionless coupling constant in the d-wave channel λ^d, relevant for superconductivity, is only 0.022, i.e., even about ten times smaller than the small value of the s-wave channel. For electronic states at the Fermi energy, the maximum in the real part of the phonon-induced self-energy at low frequencies is about a factor 5 too small compared to the experiment, resulting in a very small and smooth change in the slope of the electronic dispersion [1]. These findings suggest that phonons are not the important low-energy excitations, and cannot produce well-pronounced kinks in $YBa_2Cu_3O_7$, at least, within LDA. [1] Heid, Bohnen, Zeyher,Manske, PRL **100**, 137001 (2008).

Rolf Heid
Forschungszentrum Karlsruhe, IFP, Germany

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