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Effects of thermal disorder on electronic structure, electron-phonon coupling and spin-fluctuations in high- T_C cuprates THOMAS JARLBORG, DPMC, University of Geneva, CH1211 Geneva 4 — The superconducting T_C 's are estimated from the values of electron-phonon and spin-phonon coupling in typical high- T_C cuprates. It is shown that the couplings are peaked for just a few q-vectors because of the 2-dimensional Fermi surface shape. The involvement of few selective spin-phonon modes compensates for the low electronic density-of-states, which allows for a high T_C [1]. Thermal disorder at moderately high temperature perturbs the strongly coupled modes through incoherent potential fluctuations of the Madelung terms, and electronic structure calculations show that the effective spin-phonon coupling suffers from lattice disorder. This effect puts a limit on long-range superconductivity, while fluctuations can persist to higher temperature. BCS-type model calculations are used to show how disorder modifies the superconducting gap and reduces T_C . Some ideas of how to recuperate a higher T_C from superconducting fluctuations are discussed.

[1] T. Jarlborg, Solid State Commun. **181**, 15, (2014).

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