IN-PLANE OXYGEN BREATHING AS MECHANISM OF SUPERCONDUCTIVITY IN CUPRATE HIGH Tc MATERIALS

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ABSTRACT

The electron-phonon coupling constant in cuprate high temperature superconductors has been determined by acoustic method. A direct proportional relation between the electron-phonon coupling constant in the Van Hove scenario (which is 10-100 times smaller than the conventional BCS-type) and the transition temperature is observed. Our results show the importance of interplay between the Debye frequency and electron-phonon coupling in the two dimensional system and their variations have combined effect in governing the transition temperature. The electron-phonon coupling constant $\lambda_{vH}$ in this scenario is in the range of 0.02 – 0.05, consistent with Cooper pair formation by in-plane oxygen breathing.

REFERENCES