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Isotope dependence of the spin gap in YBa₂Cu₄O₈ as determined by Cu NQR relaxation

Raffa F., Ohno T., Mali M., Roos J., Brinkmann D., Conder K., Eremin M.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

We performed high accuracy ⁶³Cu NQR spin-lattice relaxation and SQUID magnetization measurements on ¹⁶O and ¹⁸O exchanged YBa₂Cu₄O₈ to determine the isotope shift of the temperature of the opening of the spin gap, T^* , and the superconducting transition temperature, T_c . The corresponding isotope exponents are $\alpha_T = 0.061(8)$ and $\alpha_T = 0.056(12)$ which are the same within the error bars and suggest a common origin for the superconducting and the spin gap.
