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Existence of a boson mode in underdoped YBCO NICOLAS DOIRON-LEYRAUD, S.Y. LI, Université de Sherbrooke, M. SUTHERLAND[1], University of Toronto, L. TAILLEFER, Université de Sherbrooke and CIAR, R. LIANG, D.A. BONN, W.N. HARDY, University of British Columbia and CIAR — We have examined the underdoped region of the cuprate phase diagram via a study of heat transport at temperatures down to 50 mK in samples of YBCO with a hole concentration in the vicinity of 5%. The measured thermal conductivity was found to be well described by a sum of three terms, $\kappa(T) = aT + bT^{\alpha} + cT^3$, which we associate with, respectively, fermionic quasiparticles, phonons, and a new bosonic mode. By comparing data taken at different doping levels on the same sample it was possible to track the evolution of the T^3 term. Its coefficient was found to increase with decreased doping, i.e., with proximity to magnetism. We speculate that this term may be associated with the transport of heat by magnons, as observed recently by Li et al. [1] in the undoped cuprate material Nd_2CuO_4. This would suggest that long range magnetic order in YBCO appears at a doping level very close to that at which superconductivity ends. [1] S.Y. Li et al., Phys. Rev. Lett. **95**, 156603(2005)

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