

**Wei, Zhang, and Feng Reply:** In the preceding Comment [1], Müller *et al.* pointed out their published photoemission data of a two-component spectral line shape in the normal state of Bi2201 and dramatic temperature dependence [2–4], which persists to temperatures well above  $T_c$ , presumably up to  $T^*$ . They argued that the superconducting peak (SCP) observed in our Letter [5] could be of the same origin as theirs. We here show that such a dramatic temperature dependence in their Comment is irrelevant to SCP, and might not even be intrinsic to Bi2201.

The conclusion of this Comment is based on the dramatic temperature dependence in its Fig. 1, where a huge gain in spectral weight (50% in the first 100 meV) is observed. Normally such a spectral weight gain should correspond to a spectral weight transfer, but no spectral weight loss at other momentum or energy has been reported so far by this group [2–4]. More importantly, to our knowledge, such a huge gain of spectral weight in Bi2201 has *never* been observed or reported by any other group in the last two decades, especially noting that it could be easily observed with an energy resolution of 30 meV and at relatively high temperatures. On the other hand, the single-component lineshape of our normal state spectra [5] agrees with all the other data reported before [6–9]. There is no such drastic temperature dependence in the normal state.

The origins of such huge gain in spectral weight should have been seriously checked especially when it disagrees with all the other reports. Numerous extrinsic factors can contribute to this temperature dependence, such as inhomogeneity or second phase in sample, or the aging effect (spurious features can be created due to surface contamination). The experimental and sample conditions should be carefully examined. Furthermore, there should be temperature cycling data to rule out time dependence. Since all these important aspects are not provided in Refs. [2–4], one has reasons to suspect the observation in this Comment is not intrinsic to Bi2201.

As illustrated in our Letter [5], the SCP is very delicate, and it can be observed only with the best quality samples of zero residual resistance and a high  $T_c$  of 34 K, and with an energy resolution of 7 meV. Our temperature dependence behavior is very similar to the SCP behavior in Bi2212. Müller *et al.* pointed out the possibility of some tiny residual peaks in Fig. 2(c1) of our paper. However this

cannot be used as evidence against our observation of the SCP, as it is well known that the SCP can survive to about 10 K above  $T_c$  due to fluctuations of the superconductivity [10]. The Fig. 3 in our Letter further illustrated the more detailed temperature dependence.

Furthermore, the energy scales and the dispersions of the two components in their data (see Fig. 4 in Ref. [3]) are quite different from the behaviors of the SCP in Bi2201 and Bi2212. The peak near the Fermi energy in Ref. [3] does not disperse asymptotically to a certain energy scale that is related to the energy scale of a bosonic mode, but rather disperses to a much higher energy of about 100 meV. These features are thus irrelevant to the SCP discussed in our paper.

In conclusion, two-component spectral line shape in the normal state of Bi2201 and dramatic temperature dependence observed by Müller *et al.* are irrelevant to the SCP. The extrinsic effect during the experiment could be the origin of such dramatic temperature dependence, and both the data and conclusions in this Comment should be questioned.

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Received 13 August 2009; published 3 September 2009

DOI: 10.1103/PhysRevLett.103.109702

PACS numbers: 74.72.Hs, 71.18.+y, 79.60.Bm

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- [1] B. Müller *et al.*, preceding Comment, Phys. Rev. Lett. **103**, 109701 (2009).
- [2] R. Manzke *et al.*, Phys. Rev. B **63**, 100504 (2001).
- [3] C. Janowitz *et al.*, Europhys. Lett. **60**, 615 (2002).
- [4] R. Manzke *et al.*, Physica (Amsterdam) **408C**, 780 (2004).
- [5] J. Wei *et al.*, Phys. Rev. Lett. **101**, 097005 (2008).
- [6] T. Kondo *et al.*, Phys. Rev. Lett. **98**, 267004 (2007).
- [7] T. Sato *et al.*, Phys. Rev. B **64**, 054502 (2001).
- [8] W. Meevasana *et al.*, Phys. Rev. B **75**, 174506 (2007).
- [9] J. Mesot *et al.*, Phys. Rev. B **63**, 224516 (2001).
- [10] D. L. Feng *et al.*, Science **289**, 277 (2000).