Dai *et al.* Reply: It would seem to be largely unproductive to argue over rather unimportant effects in the data analysis of our neutron scattering results, however, the Comment of Bourges and Regnault [1] requires an answer since it not only is incorrect, but also misses the interesting physics of the problem. The central point of their Comment on our Letter was that we [2] had made a mistake in analyzing the data and that the magnetic signal at the position (π, π) at 24 meV was more than one-third of the resonance at 34 meV in the low temperature superconducting state for $YBa_2Cu_3O_{6.6}$ ($T_c = 62.7$ K). Detailed arguments below show that their conclusion is incorrect. Of much more interest is the fact that recent measurements [3] show that the magnetic fluctuations for energies below the resonance are incommensurate and, therefore, clearly different from those suggested by the authors [4].

We first show why the magnetic intensity at (π, π) at 24 meV cannot be more than one-third of the strong peak at 34 meV at 11 K. Instead of presenting background subtracted data as shown in Fig. 1 of our Letter [2], we show in Fig. 1(a) the original raw spin-flip (SF) scattering constant-Q scan data at 11 K (closed circles) and the analyzer turned scattering (SF and/or nonspin-flip) data (open circles) at the identical condition which serves as the background [5]. Inspection of the figure suggests that the magnetic signal above the background at 24 meV is much less than that at 34 meV. If Bourges and Regnault were correct in their analysis of our data, one would expect the magnetic intensity at 24 meV to be at least (1/3 peak intensity at 34 meV) 7.3 ± 2 counts/600 monitor above the background. Instead, the signal at 24 meV is, to within the statistics of the data, indistinguishable from the background. Figure 1(b) shows the background subtracted SF scattering. Summing all the data points below 28 meV, we find that the average intensity is 2.07 ± 1.07 counts/600 monitor. This value is much lower than the estimate of Ref. [1]. In fact, simple statistical analysis shows that the sensitivity of the polarized measurements for energies below the resonance is about one-fifth of the resonance (twice the statistical error, or 4 counts/600 monitor).

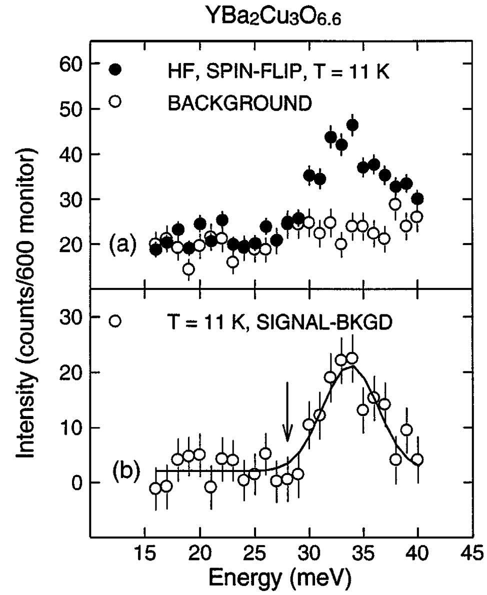

FIG. 1. (a) Polarized raw SF scattering at the (−0.5, −1.5, 1.7) r.l.u. position at 11 K (closed circles). Analyzer-turned scattering (open circles). (b) SF scattering at 11 K after the subtraction of the background.

Since the publication of our Letter, we have performed more precise, measurements with unpolarized neutrons [3]. Indeed, our new data show that at 11 K, the magnetic signal at 24 meV at (π, π) is much smaller than one-third that of the resonance, consistent with the polarized data. In fact, most of the spectral weight of the low frequency magnetic fluctuations occurs at incommensurate wave vectors.

It is true that polarized measurements are hampered by low counting rates. However, such measurements have supplied extremely important results such as the first clear picture of the dominant magnetic scattering in the superconducting state of optimally doped [6] and underdoped $YBa_2Cu_3O_{7-x}$ [2]. We also want to clarify that we never stated that there is no pseudo spin-gap in $YBa_2Cu_3O_{6.6}$. In fact, we have observed a spin pseudogap in our sample above T_c and the result will be published in a forthcoming paper [7]. Finally, as to the physical conclusions which can be drawn from our measurements, we agree that the essential physics described in our Letter is far from that reported by the authors for this doping regime.

This research was supported by the U.S. DOE under Contract No. DE-AC05-96OR22464 with Lockheed Martin Research Corporation.

P. Dai,[1] M. Yethiraj,[1] H. A. Mook,[1] T. B. Lindemer,[1] and F. Doğan[2]
[1]Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6393
[2]University of Washington
Seattle, Washington 98195

Received 4 June 1997 [S0031-9007(97)04855-2]
PACS numbers: 74.72.Bk, 61.12.Ex

[1] P. Bourges and L. P. Regnault, preceding Comment, Phys. Rev. Lett. **80**, 1793 (1998).
[2] P. Dai *et al.*, Phys. Rev. Lett. **77**, 5425 (1996).
[3] P. Dai *et al.*, Phys. Rev. Lett. (to be published).
[4] L. P. Regnault *et al.*, Physica (Amsterdam) **213B & 214B**, 48 (1995).
[5] Although analyzer turned scattering events in an inelastic scattering measurement may not represent the whole background, it is a lower bound of the background scattering.
[6] H. A. Mook *et al.*, Phys. Rev. Lett. **70**, 3490 (1993).
[7] P. Dai, H. A. Mook, and F. Doğan, cond-mat/9707112.

 © 1998 The American Physical Society