Tjeng *et al.* Reply: In our Letter [1] we have reported the observation of the Kondo resonance and its temperature dependence in our photoemission and x-ray absorption spectroscopy data of $YbAl_3$. While Murani [2] does not dispute our observation, nor the consistency of this observation with bulk susceptibility measurements, he questions the agreement with the neutron scattering data of Walter, Holland-Moritz, and Fisk [3], and makes various comparisons and comments concerning our photoemission data, and both his own neutron scattering data [4] and that of [3].

We agree with Murani's detailed summary of the work in [3]. The T_0 (or T_K) value of 300–400 K given in [3] is not deduced directly from the data. The ≈ 18 meV energy of the inelastic peak assigned as the Kondo resonance is obtained by extrapolation to 0 K of the energies of an inelastic peak observed at 9.5, 10.3, and 12.2 meV for temperatures of 120, 80, and 50 K, respectively. This ≈ 18 meV is about 50% smaller than the T_K value inferred from the bulk susceptibility and from our photoemission data. We note that Murani's data [2,4] do not show this low energy peak.

We also agree with Murani [2] that changing his original assignment [4] of the inelastic peak at ≈ 32 meV from an f-band hybridization gap to the response associated with the Kondo effect, would imply a T_K [5,6] much more consistent with the ≈ 400 K value inferred from the bulk susceptibility or our photoemission data [1]. This higher energy peak is observed both by Walter, Holland-Moritz, and Fisk [3], and by Murani [2,4]. It would then be necessary to reassign the lower energy peak. We note that the inelastic peaks at ≈ 46 and ≈ 79 meV [3,4] still await a satisfactory interpretation. Concerning the second paragraph of Murani's Comment, we disagree with his underlying philosophy that the neutron scattering data can be compared directly to photoemission data. The only meaningful exercise is the comparison of the data and the theoretical predictions for a given spectroscopy and a given Hamiltonian, as we have done for photoemission and the Anderson impurity Hamiltonian. Since neutron scattering and photoemission are quite different probes of the system, each having their own response functions, and relaxation mechanisms, it is not surprising that the theoretical predictions of the Kondo effects in each can differ significantly.

An example of such a difference is provided by the temperature dependences of the peak positions in the two spectroscopies. NCA calculations for the impurity Anderson model (see Figs. 7, 8, and 45 of Ref. [5]) predict qualitatively that for increasing $T \leq T_K \approx 400$ K, the photoemission peak shifts to higher energies while the neutron scattering peak shifts to lower energies. As Murani has noticed [2], exactly this difference occurs for the peak in our data [1] and for the peak identified by Walter, Holland-Moritz, and Fisk as the Kondo resonance [3]. Also Murani's data [4] show for the ≈ 32 meV peak a quite similar shift with temperature.

In our view, these and other aspects of the neutron scattering data, such as the temperature dependence of the linewidth, still need to be compared quantitatively with realistic theoretical calculations done explicitly for $YbAl_3$. We may have to accept that apparently the neutron data and their interpretation are at present somewhat ambiguous, due to different experimental conditions and uncertainties introduced by the phonon background subtraction procedure. Also the presence of several closely spaced inelastic lines with inherently large widths, in combination with the large statistical noise may add to this ambiguity.

L. H. Tjeng,[1,2] S.-J. Oh,[3] C. T. Chen,[1] J. W. Allen,[4] and D. L. Cox[5]
[1]AT&T Bell Laboratories
600 Mountain Avenue
Murray Hill, New Jersey 07974
[2]Physics Department
University of Groningen
9747 AG Groningen, The Netherlands
[3]Physics Department
Seoul National University
Seoul, 151-742, Korea
[4]Physics Department
University of Michigan
Ann Arbor, Michigan 48109
[5]Physics Department
Ohio State University
Columbus, Ohio 43210

Received 25 January 1994
PACS numbers: 71.28.+d, 75.20.Hr, 78.70.Dm, 79.60.Bm

[1] L. H. Tjeng *et al.*, Phys. Rev. Lett. **71**, 1419 (1993).
[2] A. P. Murani, preceding Comment, Phys. Rev. Lett. **72**, 4153 (1994).
[3] U. Walter, E. Holland-Moritz, and Z. Fisk, Phys. Rev. B **43**, 320 (1991).
[4] A. P. Murani, Phys. Rev. Lett. **54**, 1444 (1985).
[5] N. E. Bickers *et al.*, Phys. Rev. B **36**, 2036 (1987).
[6] Y. Kuramoto and E. Müller-Hartmann, J. Magn. Magn. Mater. **52**, 122 (1985).

0031-9007/94/72(26)/4154(1)$06.00