Arndt *et al.* Reply: The Comment by Stahov, Sadler, and Abaev [1] on our recent Letter [2] questions our use of fixed-t dispersion relations (FTDR) in determining the pion-nucleon coupling constant. These authors have further explored this problem via interior dispersion relations (IDR), finding results which seem to contradict those which we have quoted [2].

We have recently [3] repeated our determination of the pion-nucleon coupling using the dispersion relation exploited by Bugg, Carter, and Carter [4]. When the determination was carried out in a kinematic region which had been thoroughly explored experimentally, a very consistent value of the coupling resulted [3]. The error on this coupling was also found [3] to be consistent with our earlier [2] estimate. Conflicts in the charge-exchange and low-energy data base do not affect this result [3,5]. We have also pointed out [3] that both the Virginia Tech [6] and Karlsruhe [7] analyses show a t dependence in the extracted pion-nucleon coupling. Thus, no modern analysis both fits the scattering data and remains in precise agreement with FTDR.

In order to check the IDR results, we have applied the techniques of Ref. [8] to our solution [6]. We have extracted a value of the pion-nucleon coupling from a set of fixed laboratory-scattering-angle curves defined by the parameter a. The point $a=0$ was carefully avoided, as suggested in Ref. [8]. We have found a range of coupling values consistent with the determinations of Refs. [2] and [3]. The estimation of errors appears to be more difficult in the IDR method as the discrepancy function has no predetermined functional form. The extracted coupling is sensitive to both the functional form of the discrepancy function and the range of energies over which it is fitted. Its dependence on the low-energy region is also a source of worry. The fixed-t extraction is based on a linear extrapolation and appears to be more reliable, given the current problems with the low-energy data base.

Our study of the IDR technique followed the methods of Ref. [8] and did not utilize the $\pi\pi \rightarrow N\bar{N}$ amplitudes. We have previously noted [5] that these amplitudes, given in Ref. [9] of the Comment, implicitly contain information from the Karlsruhe pion-nucleon analyses. Our IDR calculations have produced a smoothly varying set of points to which the discrepancy function was fitted. The numerical results [9] found by the authors of Ref. [1] show a more "noisy" behavior. We have found that considerable care is required in the IDR numerical calculations. This could be responsible for some of the differences between our results and those of the preceding Comment.

One should note that analyses constrained to satisfy FTDR result in biased determinations of f^2. A value of f^2 is implicit in the FTDR constraints. This coupling will be reflected in any subsequent "extraction." Once the correct value of f^2 is determined, via an unbiased fit, FTDR constraints can be applied.

We thank R. J. Jacob for useful discussions about the IDR technique and the authors of Ref. [1] for making further details of their calculation available to us. This work is supported in part by a U.S. Department of Energy Grant No. DE-AS05-76ER04928.

R. A. Arndt, Z. Li, L. D. Roper, and R. L. Workman
Department of Physics
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

Received 22 October 1991
PACS numbers: 13.75.Gx, 11.50.Nk, 21.30.+y, 25.80.Dj

[1] J. Stahov, M. E. Sadler, and V. V. Abaev, preceding Comment, Phys. Rev. Lett. **68**, 548 (1992).
[2] R. A. Arndt, Z. Li, L. D. Roper, and R. L. Workman, Phys. Rev. Lett. **65**, 157 (1990).
[3] R. A. Arndt, Z. Li, L. D. Roper, and R. L. Workman, Phys. Rev. D **44**, 289 (1991).
[4] D. V. Bugg, A. A. Carter, and J. R. Carter, Phys. Lett. **44B**, 278 (1973).
[5] R. A. Arndt and R. L. Workman, Phys. Rev. C **43**, 2436 (1991).
[6] R. A. Arndt, Z. Li, L. D. Roper, and R. L. Workman, Phys. Rev. D **43**, 2131 (1991).
[7] R. Koch (private communication).
[8] G. Hite, R. J. Jacob, and D. C. Moir, Phys. Rev. D **12**, 2677 (1975).
[9] We thank M. E. Sadler for providing graphical results from the calculations of Ref. [1].