

Ericson *et al.* Reply: Our Letter [1] and the preceding Comment [2] reflect two fundamentally different, although complementary, philosophies on how to determine a fundamental physics quantity, such as f_c^2 , reliably from experimental data. It is important to realize that it is not only the precise value of f_c^2 that is under discussion, but the procedures to determine it.

Our Letter argues basically that a rather small, but well-controlled, data set on a relevant observable can be used for an accurate determination when carefully analyzed. In such an approach each of the steps can be separately criticized and/or improved. Our Letter is specific concerning the choice of precise experimental data, the extrapolation method, and the check of systematic errors. In all of these respects we have performed more work since the publication of Ref. [1], and we find that the procedure is kept under good statistic and systematic control [3]. Since our method is unusable without a knowledge of the *absolute* cross section, we have reduced the normalization error by a factor of 2 since the Letter was published, and it contributes at present only 1% to the error of f_c^2 .

The Comment represents the philosophy of a global partial wave analysis (PWA) approach, involving many observables and many data sets, treated by statistical methods and selection criteria. This approach, in which f_c^2 results as a by-product, is important for an overall consistent view of the NN interaction. It should be realized, however, that the method only partially accounts for systematic errors and correlations between data. In addition, the differential data are relatively loosely normalized.

The authors of the Comment first question the use of backward np cross sections as an important source of information on f_c^2 . We have explicitly shown in Refs. [1] and [3], using “pseudodata” from models in common use, including the Nijmegen potential, that our method reproduces the input f_c^2 to about 1%. There may be other observables that give high precision information, but we are not aware of such data suitable for direct analysis. The insensitivity found in Ref. [8] in the Comment [2] appears to be a consequence of the specific global analysis, using differential cross sections with loose normalization, and is not directly relevant to our approach.

They also question the accuracy of the extrapolation method itself, and refer to their findings in the same reference that single energy extrapolations give an order of magnitude less precision than we claim. Since the method they used is quite different from ours, it is difficult to judge what impact their result has on our analysis. Their conclusion is, however, at variance with our detailed studies using pseudodata with “experimental” points and error bars similar to those of our experiment.

In the application by Arndt *et al.* (Ref. [9] in Comment) of the difference method to most available backward np data (except those of Hürster *et al.* [4]), the

extrapolation error for the individual data sets is indeed up to about an order of magnitude larger than in our work. This is due to the larger statistical errors of most data sets, as well as to their use of higher degree polynomials in the fits. It shows that high precision requires much more detailed analysis and critical examination of input data. Their average f_c^2 and its error are, however, similar to those of PWA’s using the same sample of data.

Their second major criticism concerns the experimental data, which have a steeper slope at backward angles ($\theta_{c.m.} \geq 150^\circ$) than the pioneering data of Bonner *et al.* at 162 MeV, and the ones found from the PWA’s of Nijmegen and Arndt *et al.* (Refs. [10], [2], and [4], respectively, in Comment). It should be noted that the data of the present experiment is of a far better quality than those of Bonner at 162 MeV. Applying our extrapolation method to these data leads to a lower f_c^2 , but in view of the quality of the data the error is large. It is the steeper slope of our data which leads to a higher f_c^2 . This is certainly not due to the way we normalize our data, which is clearly demonstrated in Ref. [3]. Our shape agrees, on the other hand, with that of the Hürster *et al.* data [4], which are not used in the mentioned PWA’s. It also agrees well with the high energy ($E_n \geq 400$ MeV) Bonner data. It is therefore possible that the lower energy Bonner data may have led the NN PWA’s to favor a flatter slope of the backward differential cross section. This point needs further experimental studies as stated in our Letter.

This should answer the main criticisms raised in the Comment. However, a crucial point concerning both approaches is that of the systematic error, which must be explicitly confronted. It is more important than the statistical errors.

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Received 1 May 1996; revised manuscript received
24 April 1998 [S0031-9007(98)07814-4]

PACS numbers: 13.75.Cs, 13.75.Gx, 21.30.Cb

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