Hammans *et al.* Reply: The Comment [1] by Machleidt and Slaus on our paper [2] makes two points to justify that the value of ε_1 determined there may be incorrect:

(1) There are NN potentials which predict ε_1 at 50 MeV substantially below the Basel value and reproduce the Basel A_{zz} data accurately. This may be the case (see Refs. [2,3]), but it is not relevant. While A_{zz} is the observable most sensitive to ε_1 [4], it by no means depends exclusively on ε_1. One obviously can find potentials or combinations of phases that reproduce one selected observable. In particular, given the strong correlation between ε_1 and ${}^1P_1$, one can trade smaller values of ε_1 for more negative values of ${}^1P_1$. However, this ambiguity is broken when using *all* data. This is demonstrated in Fig. 1 where the most recent phase shift analyses (PSA's) and potential models are compared in an ε_1-${}^1P_1$ diagram at 50 MeV. Our results (PSI93) are obtained from a careful analysis of the *work data on n-p and p-p scattering* in this energy region. This *energy independent* analysis involves the minimal amount of theoretical bias and is based on a detailed reevaluation of all data included. The analysis of the *complex* set of *NN* data gives the *experimental value* of ε_1: $2.80° \pm 0.25°$ [3].

Given the differences in the data bases used, our analysis agrees well with all other recent single energy (s.e.) analyses [5-7]; see Figs. 1 and 2. The higher trend of Arndt's values below 150 MeV is due to the inclusion of the Harwell cross sections which are rejected in Refs. [3,4]. The multienergy (m.e.) results [5] shown in the Comment follow from a simple, fitted energy parametrization for each phase which cannot reproduce the trend of the s.e. values. This is clearly borne out by the fact that the χ^2 of the m.e. analysis is higher by 180 (or 5%) compared to the sum of all s.e. analyses.

In conclusion, using the current world data around 50 MeV there is no question that the experimental values of ε_1 and ${}^1P_1$ are significantly different from theoretical prediction.

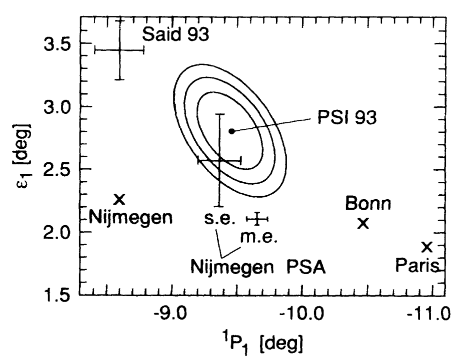

FIG. 1. ε_1-${}^1P_1$ diagram at 50 MeV for potential models (×) and for the PSA's discussed in the text (crosses with error bars). The contour lines around PSI93 correspond to an increase in χ^2 by 1, 2, and 3, respectively.

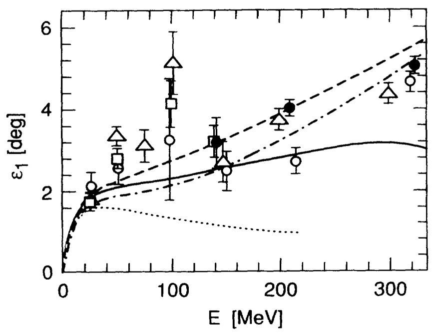

FIG. 2. Model predictions from "full Bonn" (solid), Bonn A (dotted), Nijmegen (dashed), and Paris (dash-dotted). The symbols represent s.e. phase shift results from Ref. [7] (triangles), Ref. [6] (dots), Ref. [5] (open circles), and Ref. [3] (open squares).

(2) Machleidt and Slaus have found no sensible theoretical model of the NN interaction that can reproduce the high value of ε_1. This finding has an impact on our value of ε_1 only to the degree that one accepts the time-honored principle that "it cannot be what may not be" [8]. The value of ε_1 given in [3] is the one that, together with all the other phases determined as well, *best reproduces the data.* The idea to question experimental facts by using theoretical bounds without proper study of the limitations of theory is *unacceptable in principle.*

M. Hammans, C. Brogli-Gysin, S. Burzynski,
J. Campbell, P. Haffter, R. Henneck, W. Lorenzon,
M. A. Pickar, and I. Sick
Institut für Physik
Universität Basel, Basel, Switzerland

J. A. Konter, S. Mango, and B. van den Brandt
Paul-Scherrer-Institut
CH-5232 Villigen, Switzerland

Received 20 December 1993
PACS numbers: 21.30.+y, 13.75.Cs, 13.88.+e, 25.10.+s

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0031-9007/94/72(16)/2665(1)$06.00