COMMENTS

Deuteron Photodisintegration below 100 MeV

Recently it has been claimed[1] that a systematic discrepancy exists between experimental deuteron total photodisintegration cross-section data and theoretical results obtained in the conventional framework between 20 and 80 MeV, which cannot be remedied within this framework. The authors propose to cure this disease by introducing into the interior of the deuteron a novel nonnucleonic, but not further specified, state, whose $E1$ contribution is added incoherently. I will not discuss this unusual procedure, and leave aside all questions on how other important properties of the deuteron are changed. The whole purpose of this Comment is to point out that the existing experimental data do not provide a firm basis for such drastic conclusions. To show this I have plotted in Fig. 1 the ratio of experiment to the conventional theory. I have also included the data of Galey[2] in contrast to Ref. 1, and the most recent data from Bosman *et al.*[2] The calculation is similar to the work of Partovi[6] except for some slight improvements.[7] The influence of π-exchange currents (MEC) and isobar configurations (IC) is rather small in the region of interest. Figure 1 also contains the predictions of two more recent potential models. Up to about 40 MeV the data cluster within a band of $\pm 10\%$ around the theory except for the data of Baglin *et al.*[2] Between 40 and 80 MeV the data are rather scarce and do not indicate a systematic deviation. Even if we neglect the data of Galey[2] and Bosman *et al.*,[2] the significance of the remaining data is too poor to support the claim of Ref. 1. The error bars do not contain systematic errors, which are not negligible. Thus, the only conclusion one really should draw from Fig. 1 is that high-quality data for deuteron photodisintegration are urgently needed to assess the validity and the limits of the conventional nuclear theory, in particular above 40 MeV, not only for the total cross section but also for angular distributions, where the experimental situation is worse,[7] and for nucleon polarization.

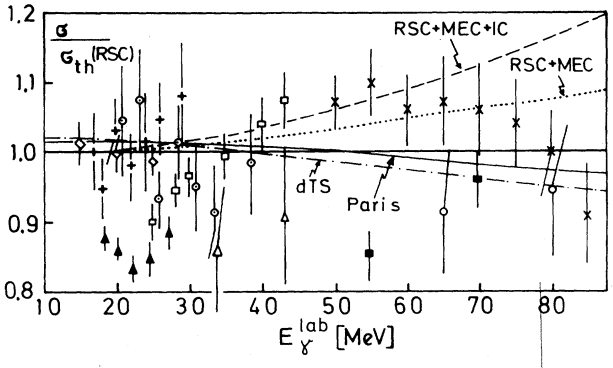

FIG. 1. Ratio of σ_{exp} (Ref. 2) to σ_{th}(RSC) for a Reid soft-core potential (Ref. 3). The experimental errors are given as in the original publications in contrast to Ref. 1. Furthermore, the influence of exchange effects (dotted curve, MEC only; dashed curve, MEC and IC) and the ratio of σ_{th} to σ_{th}(RSC) for the potentials of Refs. 4 (dTS) and 5 (Paris). Data points are from Refs. 2: open triangles, Allen; open circles, Whalin *et al.*; solid squares, Aleksandrov *et al.*; crosses, Galey; open squares, Weissman and Schultz; solid triangles, Baglin *et al.*; diamonds, Ahrens *et al.*; plusses, Skopik *et al.*; circles with dots, Bosman *et al.*

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