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D-Phase Dependence of Nucleon-Helium Polarization

By R. E. White, A. E. R. E., Harwell

Above 10 MeV nucleon energy D phases begin to contribute significantly to both the cross-section and the polarization in nucleon-helium scattering [1, 2, 3][1]). At present these D phases, while small, are only poorly determined, a collection of assignments made by various workers is shown in figure 1 [2, 4, 5].

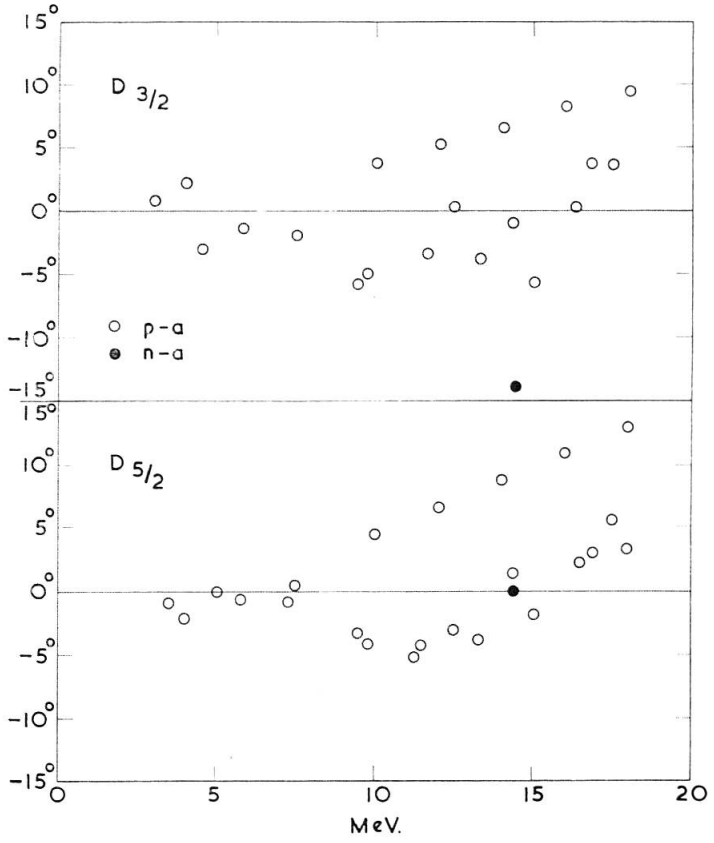


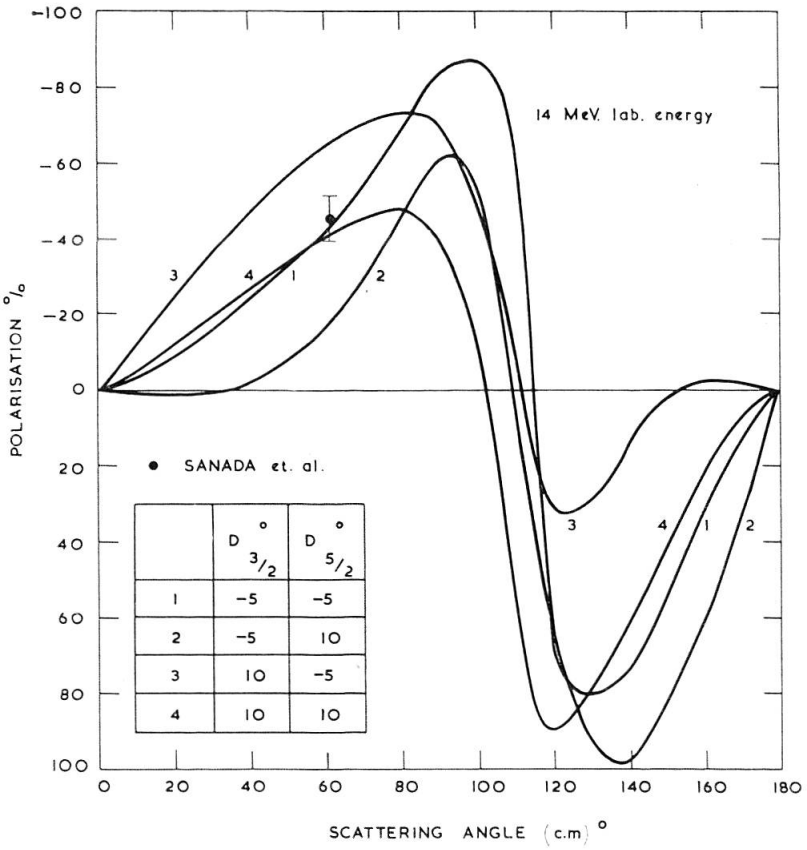
Figure 1

The effect of this uncertainty on the polarization is illustrated for 14 MeV nucleon energy in figure 2 which shows polarization angular

[1]) Numbers in brackets refer to References, page 336.

distributions for four extreme sets of D phases consistent with the assignments in figure 1. S and P phases were taken to be $\delta_0 = -92°$, $\delta_1 + = 92°$, $\delta_1 - = 45°$ in each case. The true polarization angular distribution should lie among these curves, and it is seen that the uncertainty is sufficiently large that above about 10 MeV available polarization graphs [1, 2, 3] should be used with caution.

One point measured at 14.4 MeV [6] is also shown in figure 2, but many more such measurements are needed to remove this ambiguity.



	$D_{3/2}$ °	$D_{5/2}$ °
1	−5	−5
2	−5	10
3	10	−5
4	10	10

Figure 2

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