The Reaction $Li^7(p,\alpha)\alpha$ with Polarized Protons

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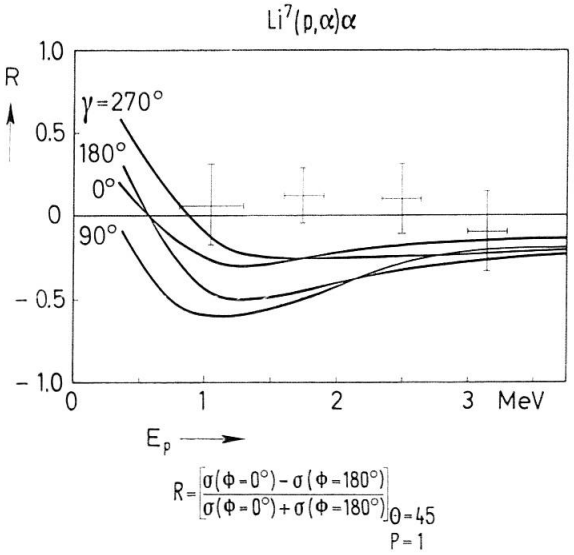
If this reaction is induced by polarized protons one expects a right-left asymmetry for the α-particles emitted in the break up of the Be^8-compound state. Polarized protons were produced by the $C^{12}(d,p)$-stripping reaction ($E_d = 1.06$ MeV). The proton polarization has been measured by JURIĆ and ĆIVILOV [1][1]) and is $P = 0.35 \pm 0.12$ for $\theta = 52°$.

Measurements for various proton energies were performed by slowing down the protons in Al-absorbers. An enriched Li^7-target was used. The α-particles were detected in nuclear emulsions. The experimental results for the relative asymmetry R are shown in the figure. Within the statistical errors no asymmetry was found.



WOLFENSTEIN [2] calculated R using a set of parameters which were deduced from the angular distribution assuming an interference of a very broad resonance with $J = 0$ and a narrow one with $J = 2$. The disagreement of these calculations (curves in the figure) with the measurements is

[1]) Numbers in brackets refer to References, page 340.

not surprising as the parameters could not be determined uniquely from the angular distribution alone. The absence of an asymmetry could be understood by assuming that the $(J = 2)$-level is formed by protons with a total angular momentum $j = 1 + s = 3/2$ but not by protons with $j = 1/2$.

However the disagreement of our results with those of TANNER communicated in the preceding report could be due to a vanishing proton polarization. The deuteron energy in the work of JURIĆ and ĆIRILOV was not known accurately (private communication) and the proton polarization might change rapidly with this energy. The determination of the proton polarization as a function of the deuteron energy is in progress.

Note added in proof: For the proton polarization a preliminary value of 0.23 ± 0.03 was found for $E_d = 1.06$ MeV. The polarization decreases rapidly for lower and higher deuteron energies.

REFERENCES

[1] JURIĆ and ĆIRILOV, C. r. du Congr. Int. de Phys. Nucl., Paris 1958.
[2] WOLFENSTEIN, Phys. Rev. *75*, 1664 (1949).