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Artikel: Polarization contours for T- and He3- scattering

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Polarization Contours for T – α and He^3 – α Scattering[1])

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We have made a phase shift analysis of the T–α elastic scattering data of Brolley and Rosen [1] at 9.225 MeV (tritium laboratory energy; actually 12.3 MeV alphas were scattered from tritium). Phillips and Miller [2] have already analyzed the lower energy He^3-α data, and found a negative $S_{1/2}$ phase shift, negative and unsplit $P_{1/2}$ and $P_{3/2}$ phase shifts, zero $D_{3/2}$, $D_{5/2}$, and $F_{5/2}$ phase shifts, and a $F_{7/2}$ phase shift which shows a resonance at about 5.5 MeV (laboratory He^3 energy). Our phase shifts for 9.225 MeV are reasonable graphical extrapolations of Phillips' and Miller's phase shifts. The phase shifts are shown in figure 1 as a function of energy.

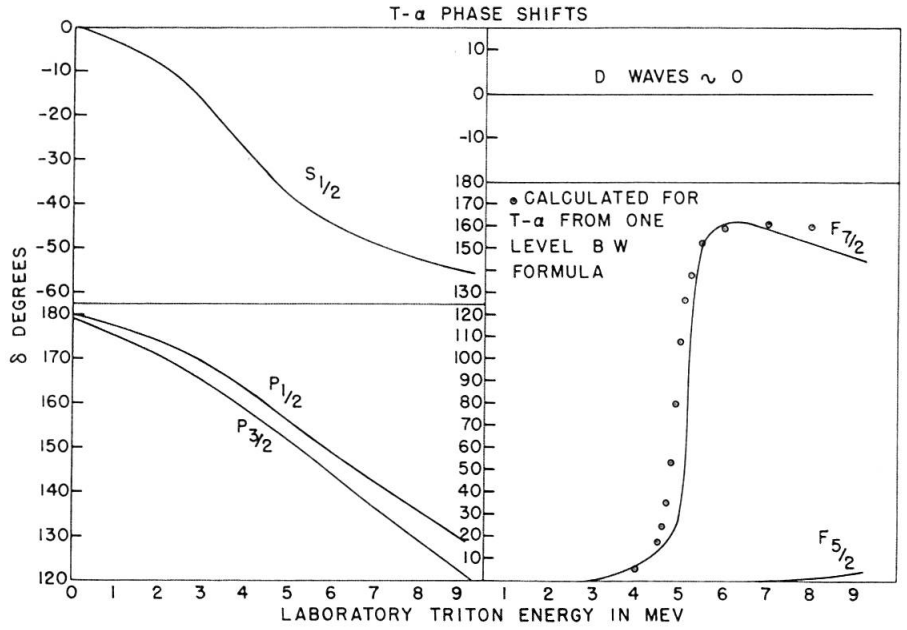

Figure 1

[1]) This work done under the auspices of the United States Atomic Energy Commission.

[2]) Presently at the Case Institute of Technology, Cleveland, Ohio.

The $F_{1/2}$ resonance is given by an optical model potential 22 MeV deep and 4 f wide.

Using the phase shifts shown in figure 1, we have calculated the T-α or He^3-α polarization as a function of energy. The results are shown in figure 2. This polarization function is only semi-quantitative, and applies to either T-α or He^3-α scattering. It provides a basis for planning the experiment described in the accompanying note by BROLLEY, GAMMEL, and ROSEN.

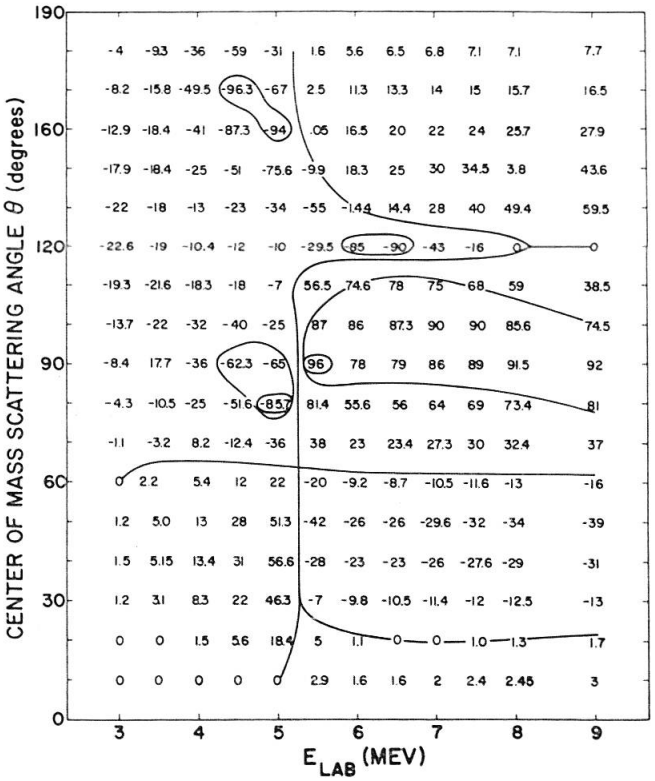

Figure 2

REFERENCES

[1] E. BROLLEY, Jr. and L. ROSEN, to be published in Phys. Rev.

[2] T. D. MILLER and G. C. PHILLIPS, Phys. Rev. *112*, 2048 (1958) and *115*, 1268 (1959).