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## Polarization Contours for T - $\alpha$ and He<sup>3</sup> - $\alpha$ Scattering<sup>1)</sup>

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We have made a phase shift analysis of the T- $\alpha$  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<sup>3</sup>- $\alpha$  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<sup>3</sup> 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.

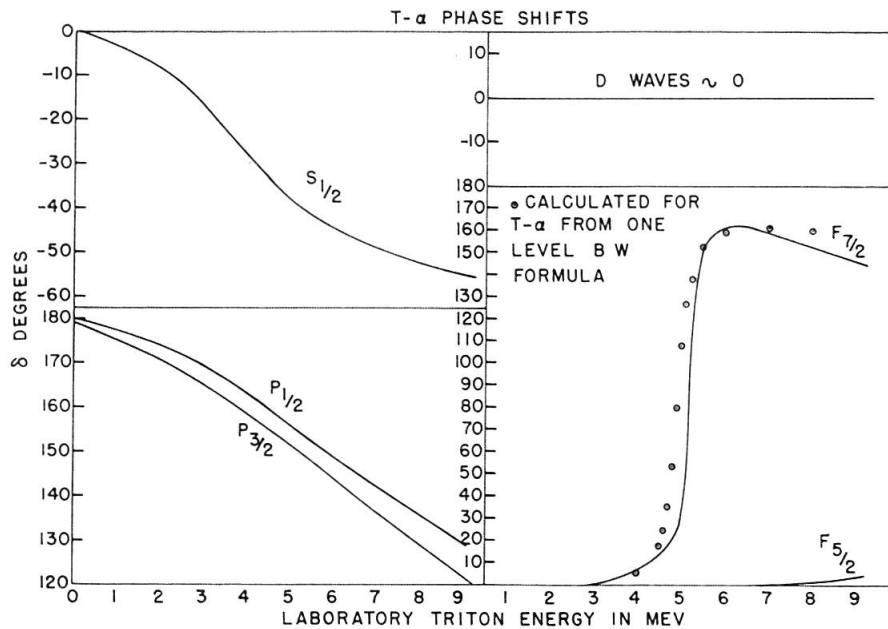


Figure 1

<sup>1)</sup> This work done under the auspices of the United States Atomic Energy Commission.

<sup>2)</sup> 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- $\alpha$  or He<sup>3</sup>- $\alpha$  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- $\alpha$  or He<sup>3</sup>- $\alpha$  scattering. It provides a basis for planning the experiment described in the accompanying note by BROLLEY, GAMMEL, and ROSEN.

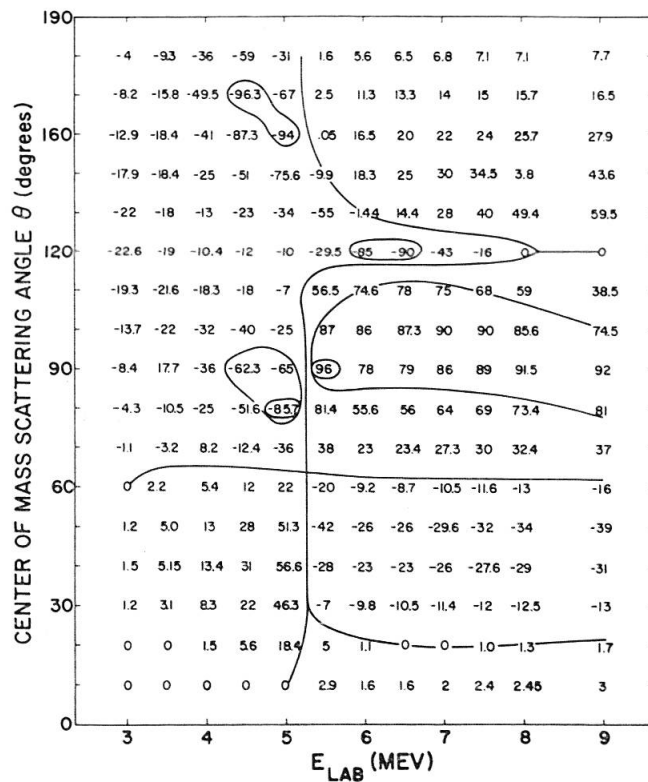


Figure 2

## 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).