SCATTERING OF POLARIZED PROTONS FROM $^6$, $^7$Li at 200 MeV

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Differential cross sections and analyzing powers for elastic and inelastic scattering of 200 MeV polarized protons from $^6$Li and $^7$Li have been measured in the angular range from $10^\circ < \theta_{cm} < 60^\circ$ using the QDM spectrometer. Typical spin up spectra at $\theta_{lab}=14^\circ$ degrees are shown in Figs. 1 and 2. Excitation of the $0^+$, $T=1$ state at 3.56 MeV in $^6$Li is clearly seen. The transition from the $(1^+, T=0)$ ground state to this $0^+$ state has the same quantum numbers as the transition for the 15.11-MeV state in $^{12}$C, but different amplitudes are expected to contribute. Angular distributions for each of the states seen in these $^6$, $^7$Li spectra are being extracted and analyzed. The angular distribution for the $(1/2^-, 1/2^+)$ state at 0.4776 MeV in $^7$Li (Fig. 2) is expected to allow determination of $M_1$ strength.

Optical model analysis of the elastic scattering data is in progress.

![Figure 1. $^6$Li($p,p'$) spectrum.](image1)

![Figure 2. $^7$Li($p,p'$) spectrum.](image2)