to the results of two previous experiments. The direct mechanism was found to be completely dominant for the (n,d) reaction, but for $^{15}N(n,t)^{13}C$ g.s. the excitation functions have significant Ericson-type fluctuations. Analyses of the (n,t) data indicated the direct contribution to the energy-averaged cross section to be 80 to 90%, and the mean level width of the ^{16}N compound nucleus to be about 400 KeV. Spectroscopic factors extracted for the $^{15}N(n,d)^{14}C$ g.s. reaction were close to the value for pure j-j coupling, but were uncertain because of sensitivity to the d+^{14}C optical potential. Within the context of conventional DWBA calculations for 2-nucleon transfer, it appears that configurations outside of the 1p shell must be included in the ^{15}N g.s. wave function to account for the magnitude of the observed (n,t) cross section.

BI 2 The Angular Distribution and Branching Ratios for the $^{10}B(n,\alpha)^{7}Li$ Reaction at 2 and 24 keV.* M. L. STELTS, M. J. KENNY, C. M. McCULLAGH,† R. E. CHRIEN and M. GOLDHABER, Brookhaven National Lab.--Recent experiments have indicated a sizable anisotropy[1] in the $^{6}Li(n,\alpha)^{3}H$ cross section down to very low neutron energies. In view of these results, we have performed a similar experiment for ^{10}B. Preliminary measurements of the $^{10}B(n,\alpha)^{7}Li$ angular distribution and branching ratios have been made at thermal, 2- and 24-keV neutron energies. External beams and Si surface barrier detectors were used. The preliminary results indicate that the ratios of the 150° to 90° cross sections are consistent with isotropy to within 5%.

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† Also, SUNY-Stony Brook.

1. S. Raman et al. Proc. of Int'l Conf. on the Interactions of Neutrons with Nuclei, 1976, CONF-760715, p. 1340.

BI 3 The $^{6}Li(n,\alpha)$ Cross Section from 80-470 keV.* CLEIDE RENNER,† J. A. HARVEY, N. W. HILL, G. L. MORGAN and K. RUSH, Oak Ridge National Laboratory -- The $^{6}Li(n,\alpha)T$ cross section has been measured from 80-470 keV at 12 discrete neutron energies produced using 8 and 12 inch iron filters at ORELA. The $^{6}Li(n,\alpha)T$ events were detected with a 1 mm thick ^{6}Li glass scintillator whose ^{6}Li content was determined to <1% uncertainty from low energy neutron transmission measurements. The neutron flux was measured with an NE-110 detector 7.5 cm thick and 10 cm dia. Monte Carlo techniques were used to compute the efficiency of the NE-110 detector and to correct for multiple interactions in the ^{6}Li detector. Values obtained in the vicinity of the resonance are 2.86 ± 0.06 barns at 218.7 keV, 3.30 ± 0.08 barns at 243.7 and 2.46 ± 0.05 barns at 272.7. An R-matrix fit by Hale[1] to all our (n,α) data gives a peak cross section at ∿240 keV of 3.36 ± 0.06 barns.

*Operated by Union Carbide Corporation for the Department of Energy.

†Guest on assignment from Institute of Atomic Energy, Sao Paulo, Brazil.

[1]G. M. Hale, private communication September 1977.

BI 4 Cross Sections for the $^{59}Co(n,\alpha)^{56}Mn$ Reaction. S. K. GHORAI, Alabama State U. and J. E. GAISER and W. L. ALFORD, Auburn U. -- The excitation function for the $^{59}Co(n,\alpha)^{56}Mn$ reaction is under study by activation techniques. Neutrons were produced from the $T(d,n)^{4}He$ reaction and were monitored through the $^{27}Al(n,\alpha)^{24}Na$ reaction in a mixed-powder method. Using a 20 cm^3 Ge(Li) detector and a 2048 channel analyzer to measure the gamma activities of ^{56}Mn and ^{24}Na, at present the cross section of the $^{59}Co(n,\alpha)^{56}Mn$ reaction has been found to be 32 ± 4 mb, 26 ± 3 mb, and 24 ± 3 mb at respective neutron energies of 15.3 ± 0.11 MeV, 16.1 ± 0.10 MeV, and 17.1 ± 0.10 MeV. The corresponding cross section values used for aluminum[1] were: 110.5 mb, 93.5 mb, and 78.5 mb. These results will be compared with the work of others including the statistical model calculations of Pearlstein.[2]

[1]A. Paulsen and H. Liskien, J. Nucl. Energy 19 (1965), 907
[2]S. Pearlstein, J. Nucl. Energy 27 (1973), 81

BI 5 Production Cross Section for (n,t) Reaction in ^{40}Ca, ^{54}Fe, ^{102}Pd, ^{112}Sn, and ^{204}Pb at 14.6 MeV Neutrons.*† G. N. SALAITA and T. W. WOO, Southern Methodist U.--The cross section for the reactions of 14.6 MeV neutrons with isotopes of the elements calcium, iron, palladium, tin and lead were measured by the activation technique using gamma-ray spectroscopy. The general trend in the (n,t) cross sections as a function of the atomic number of the target nucleus, and the probability of other competing reactions, will be discussed.[1,2]

*Submitted by George W. Crawford

†Work supported by the Robert A. Welch Foundation

[1]S.M. Qaim and G. Stöcklin, J. Inorg. Nucl. Chem. 35, 19 (1973).
[2]S.M. Qaim and G. Stöcklin, Nucl. Phys. A257, 233 (1976).

BI 6 Neutron Spectra from $^{9}Be(p,n)^{9}B$. C.D. GOODMAN, Oak Ridge Nat. Lab.*, C.D. ZAFIRATOS, U. of Colorado†, D.E. BAINUM, J. RAPAPORT, Ohio U.†, C.A. GOULDING, M.B. GREENFIELD, Florida A&M U.†, C.C. FOSTER, Indiana U.†, S.D. SCHERY, Texas A&M U.--Neutron spectra from $^{9}Be(p,n)^{9}B$ have been measured at several angles with E_p = 120 MeV. Comparison with published and unpublished data at 23, 30, 50, 62, and 80 MeV shows that the intensity of excitation of the 2.4 MeV state in ^{9}B increases strongly relative to the ground state with increasing energy. We assume that the 2.4 MeV state is reached by a spin flip isospin flip, and understand the intensity change qualitatively as an increase in the spin-flip strength relative to the non-spin-flip strength. However, the change between 23 MeV and 120 MeV is too great to be consistent with published values of $V_{\sigma\tau}/V_{\tau}$ and the assumption that the ground state excitation is an incoherent sum of Fermi-like and Gamow-Teller-like transitions. DWBA analysis is in progress.

*Operated by Union Carbide Corp. for the DOE.

†Work supported in part by DOE.

†Work supported in part by NSF.

BI 7 Lane Model Analysis of (p,p), (p,n_0), and (n,n) Reactions on ^{9}Be. R. C. BYRD and R. L. WALTER, Duke Univ. and Triangle Universities Nuclear Laboratory,* and S. R. COTANCH, N. C. State Univ. and TUNL.* --A Lane optical model description† has been obtained for $\sigma(\theta)$ and $A(\theta)$ data from 11 to 15 MeV for both (p,p) and (n,n) scattering from ^{9}Be, as well as of $\sigma(\theta)$ for the $^{9}Be(p,n_0)^{9}B$ charge-exchange reaction; we were unable to simultaneously fit our $A_{pn}(\theta)$ measurements. The calculations were made with a new code which searches on all data sets and solves the coupled Lane equations exactly. Our success indicates that careful attention to self-consistency of the potential representation and Coulomb corrections can yield an excellent optical model description, but that addition of an isospin-dependent spin-orbit term to the Lane potential may be necessary.

* Supported in part by the U. S. Department of Energy

† G. R. Satchler, in Isospin in Nuclear Physics, ed. D. H. Wilkinson (North-Holland, Amsterdam, 1969), p. 389

BI 8 (p,n) Strength Functions for Isotopes of Zr, Mo, Ag and In†. R.L. HERSHBERGER, D.S. FLYNN, F. GABBARD, University of Kentucky. Absolute total (p,n) cross sections have been measured for $^{92,94}Zr$, $^{94,95,96,98}Mo$, $^{107,109}Ag$ and natural In in the energy range of 3 to 7 MeV, using a 4π neutron detector.[1] Accuracies of from 2% to 8% were obtained (depending on target thickness uncertainties). The measured (p,n) cross sections were converted to proton strength functions, corrected for (p,γ) contributions, in