nucleus.

In conclusion, we observed strong excitation of a 0 $\hbar\omega$ stretched state in the $^{48}Ca(p,n)^{48}Sc$ reaction at 160 MeV, namely, the 7^+ state at 1.096 MeV, with a $(\pi f_{7/2}, \nu f_{7/2}^{-1})$ major configuration; however, we found no evidence for 1 $\hbar\omega$ stretched states based on $(\pi g_{9/2}, \nu f_{7/2}^{-1})8^-$ or $(\pi f_{7/2}, \nu d_{5/2}^{-1})6^-$ configurations. The excitation of stretched states of the 0 $\hbar\omega$ type should prove to be a useful tool for studying the isovector-tensor term of the effective nucleon-nucleon interaction.

1) W.G. Love in The (p,n) Reaction and the Nucleon-Nucleon Force, ed. by C.D. Goodman et al. (Plenum, New York, 1980), p. 23.

2) R.A. Lindgren, W.J. Gerace, A.D. Bacher, W.G. Love, and F. Petrovich, Phys. Rev. Lett. 42, 1524 (1979).

3) R.S. Henderson, B.M. Spicer, I.D. Svalbe, V.C. Officer, G.G. Shute, D.W. Devins, D.L. Friesel, W.P. Jones, and A.C. Attard, Aust. J. Phys. 32, 411 (1979).

4) G.S. Adams, A.D. Bacher, G.T. Emery, W.P. Jones, R.T. Kouzes, D.W. Miller, A. Picklesimer, and G.E. Walker, Phys. Rev. Lett. 38, 1387 (1977).

5) A.D. Bacher, G.T. Emery, W.P. Jones, D.W. Miller, G.S. Adams, F. Petrovich, and W.G. Love, Bull. Am. Phys. Soc. 32, 945 (1978); and to be published.

6) B.D. Anderson, M. Ahmad, A.R. Baldwin, A. Fazely, R. Madey, J.W. Watson, and C. C. Foster, Bull. Am. Phys. Soc. 25, 729 (1980).

7) P.J. Moffa and G.E. Walker, Nucl. Phys. A222, 140 (1974).

8) T.W. Donnelly and G.E. Walker, Ann. Phys. (N.Y.) 60, 217 (1970).

9) C. Gaarde, J.S. Larsen, M.N. Harakeh, S.Y. van der Werf, M. Igarashi, and A. Muller-Arnke, Nucl. Phys. A334, 248 (1980).

10) J. Raynal and R. Schaeffer, Computer code DWBA70.

11) P. Schwandt, A. Nadasen, P.P. Singh, M.D. Kaitchuck, W.W. Jacobs, J. Meek, A.D. Bacher, and P.T. Debevec, IUCF Technical and Scientific Report for Feb. 1, 1977 to Jan. 31, 1978, p. 79.

MEASUREMENT OF THE 1/E DEPENDENCE OF THE $^7Li(p,n)^7Be$ TOTAL REACTION CROSS SECTION

T.E. Ward, C.C. Foster, and G.E. Walker
Indiana University Cyclotron Facility, Bloomington, Indiana 47405

J. Rapaport
Ohio University, Athens, Ohio 43701

The excitation function, $\sigma(E)$, of the $^7Li(p,n)^7Be$ reaction was measured in the intermediate energy range of 60-199 MeV using activation techniques and γ-ray spectroscopy. This method has been used to measure the total cross section at energies of 25-44 MeV by Shery et al.[1] and at 120 MeV by Goulding et al.[2] to calibrate large volume neutron detectors. Details of the experimental procedure can be found in the IUCF 1979 annual report.[3] A summary of the results is given in Table 1. The total errors estimated for these measurements range from 8 to 14%.

The measured[1,4] excitation function, $\sigma(E)$, of the $^7Li(p,n)^7Be$ total reaction cross ssection is observed to vary inversely with the incident proton energy, E, from 25 to 200 MeV. A theoretical analysis, assuming the PWIA with an energy-independent, very-short-range interaction, using harmonic oscillator wave functions and neglecting exchange effects, yields a 1/E dependence for the summed inelastic scattering differential cross section to a particular state. This result implies that $\sigma(E) = 725.3\ (1/E) - 0.295$ with σ in millibarns, E in MeV and a determinant coefficient of 0.998.

Further, it implies that the interaction strength

Table 1. Measured total cross-sections for the $^{7}Li(p,n)^{7}Be$ (g.s. + 0.429 MeV) reaction.

PROTON ENERGY E_p(MeV)	MEASURED CROSS SECTION (10^{-27} cm^2)	PROTON ENERGY E_p(MeV)	MEASURED CROSS SECTION (10^{-27} cm^2)
60.1	12.00±1.03	119.4	5.29±0.45
62.0	11.28±1.58	138.6	4.99±0.43
69.4	10.78±1.02	143.9	4.97±0.43
79.1	8.09±0.71	156.7	4.56±0.42
88.9	7.46±1.00	174.5	3.50±0.36
100.1	7.29±0.77	199.1	3.46±0.35

function (V_τ^2 + 2.36 $y_{\sigma\tau}^2$) is independent of incident proton energy. Using recently reported determinations[5] of V_τ and $V_{\sigma\tau}$ at 24.8, 35 and 45 MeV, (V_τ^2 + 2.36 $V_{\sigma\tau}^2$) = 537 MeV^2 is obtained. Figure 1 is a plot of $|V_\tau|$ and $|V_{\sigma\tau}|$ versus E. The solid curves were calculated using this relation and experimental values[5,6] of $(V_{\sigma\tau}/V_\tau)^2$ at 24.8, 35, 45, 80 and 120 MeV. The dashed curves are based on a reasonable extrapolation of the observed energy dependence[6] of $(V_{\sigma\tau}/V_\tau)^2$.

A manuscript of this work is presently in preparation and will be submitted for publication.

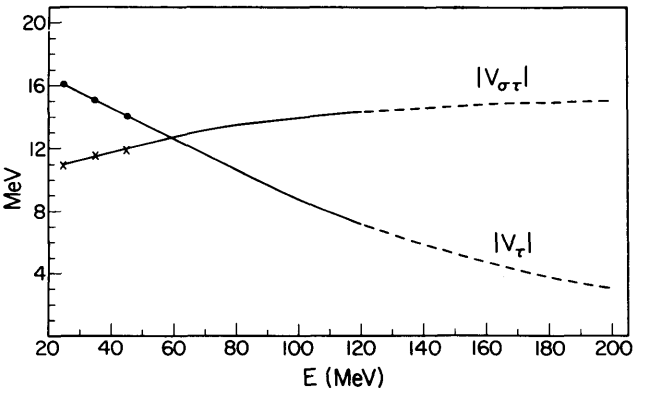

Figure 1. Plot of $|V_\tau|$ and $|V_{\sigma\tau}|$ vs. E for the $^{7}Li(p,n)^{7}Be$ reaction.

1) S.D. Schery et al., Nucl. Instr. Methods 147, 399 (1977).

2) C.A. Goulding et.al., Nucl. Phys. A331, 29 (1979).

3) IUCF Scient. and Techn. Report 1979, p. 28.

4) C.C. Foster et al., Bull. Am. Phys. Soc. 24, 828 (1979).

5) S.A. Austin et al., preprint (1980).

6) J. Rapaport et al., Bull. Am. Phys. Soc. 24, 830 (1979).