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


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

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The excitation function, \(\sigma(E)\), of the \(^{7}\text{Li}(p,n)^{7}\text{Be}\) reaction was measured in the intermediate energy range of 60-199 MeV using activation techniques and \(\gamma\)-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\(^4\)) excitation function, \(\sigma(E)\), of the \(^{7}\text{Li}(p,n)^{7}\text{Be}\) total reaction cross section 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 \(\sigma\) 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 $^{7}\text{Li}(p,n)^{7}\text{Be}$ (g.s. + 0.429 MeV) reaction.

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

function $(V_T^2 + 2.36 V_{OT}^2)$ is independent of incident proton energy. Using recently reported determinations$^5$) of $V_T$ and $V_{OT}$ at 24.8, 35 and 45 MeV, $(V_T^2 + 2.36 V_{OT}^2) = 537$ MeV$^2$ is obtained. Figure 1 is a plot of $|V_T|$ and $|V_{OT}|$ versus $E$. The solid curves were calculated using this relation and experimental values$^5,6$) of $(V_{OT}/V_T)^2$ 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 $(V_{OT}/V_T)^2$.

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

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

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