

Table 15.3 from (1976AJ04): Proton groups from  ${}^9\text{Be}({}^7\text{Li}, \text{p}){}^{15}\text{C}$  and  ${}^{14}\text{C}(\text{d}, \text{p}){}^{15}\text{C}$ 

(1974GA33) <sup>a</sup>			(1973GO28, 1975GO31) <sup>b</sup>		
$E_x$ (keV)	$\Gamma_{\text{c.m.}}$ (keV)	$J^\pi$ <sup>d</sup>	$E_x$ (keV)	$\Gamma_{\text{c.m.}}$ (keV)	$J^\pi$ <sup>h</sup>
g.s.	bound		g.s.	bound	$\frac{1}{2}^+$ j
$\equiv 740$ <sup>c</sup>	bound		$744.1 \pm 2$	bound	$\frac{5}{2}^+$ k
$3100 \pm 30$	$< 40$	$(\frac{1}{2}^-)$ <sup>e</sup>	$3105.3 \pm 5$	$\approx 42$	$(\frac{1}{2}^-)$
$4223 \pm 15$	$< 15$	$(\frac{5}{2}^-)$	$4221.1 \pm 3$	$< 14$	$(\frac{7}{2}^+, \frac{5}{2}^-)$
$(4550 \pm 30)$			f		
$5833 \pm 20$		1	f		
$5858 \pm 20$		1	f		
$6370 \pm 15$	$< 20$	$(\frac{5}{2})$	g	$< 14$ <sup>g</sup>	$(\frac{7}{2}, \frac{9}{2})^+$
$6436 \pm 20$			$6428.1 \pm 7$	$\approx 50$	$(\frac{3}{2}, \frac{5}{2}, \frac{7}{2})$
$6461 \pm 20$			g	$< 14$ <sup>g</sup>	$(\frac{9}{2}^-, \frac{11}{2})$
$6542 \pm 15$	$< 20$	$(\frac{3}{2})$	$6539.8 \pm 5$	$< 14$	$(\frac{9}{2}^-, \frac{11}{2})$
$6639 \pm 15$	$20 \pm 10$	$(\frac{3}{2})$			
$6847 \pm 15$	$< 20$	$(\frac{11}{2}, \frac{13}{2})$	$6844.9 \pm 5$	$< 14$	$(\frac{13}{2}, \frac{11}{2})^+$
$6894 \pm 15$	$< 20$	$(\frac{7}{2}, \frac{9}{2})$	$6882.4 \pm 5$		$((\frac{9}{2}^-, \frac{11}{2}^+, \frac{13}{2}^+))$
$7100 \pm 15$	$< 15$	$(\frac{3}{2})$	$7097.2 \pm 6$		
$7354 \pm 15$	$20 \pm 10$	$(\frac{9}{2}, \frac{11}{2})$	$7351.3 \pm 6$		
$7414 \pm 20$					
$7750 \pm 30$ <sup>i</sup>			$7.81 \pm 10$ <sup>m</sup>		
$8010 \pm 30$					
$8130 \pm 30$ <sup>i</sup>			$8.10 \pm 10$ <sup>m</sup>		
$8491 \pm 15$	$40 \pm 15$	$(\frac{9}{2}, \frac{11}{2}, \frac{13}{2})$	$8.46 \pm 10$ <sup>m</sup>		
$8559 \pm 15$	$40 \pm 15$	$(\frac{7}{2} \rightarrow \frac{13}{2})$			
$9000 \pm 30$					
$(9730 \pm 30)$					
$9789 \pm 20$	$20 \pm 15$	$(\frac{9}{2} \rightarrow \frac{15}{2})$			
$10248 \pm 20$	$20 \pm 15$	$(\frac{5}{2}, \frac{7}{2}, \frac{9}{2})$			
$11015 \pm 25$					
$11123 \pm 20$	$30 \pm 20$	$(\frac{11}{2} \rightarrow \frac{19}{2})$			
$(11680 \pm 30)$					
$11825 \pm 20$	$70 \pm 30$	$(\frac{13}{2} \rightarrow \frac{31}{2})$			

- <sup>a</sup>  ${}^9\text{Be}({}^7\text{Li}, \text{p})$ :  $E({}^7\text{Li}) = 20$  MeV.  $E_x$  based on 740 keV for first excited state.
- <sup>b</sup>  ${}^{14}\text{C}(\text{d}, \text{p})$ :  $E_d = 12 - 14$  MeV.
- <sup>c</sup>  $E_x = 739 \pm 1$  keV (1975HA42): from  $E_\gamma$ .
- <sup>d</sup> Suggested  $J^\pi$  assignments based on angular distributions (and  $2J_f + 1$  dependence) and  $l_{\text{max}}$  from  $\Gamma_n$ : see (1974GA33).
- <sup>e</sup>  $\theta_n^2 = 0.0075 \pm 0.0015$  (1974GA33).
- <sup>f</sup> Not observed.
- <sup>g</sup> Observed in the later work of (1975GO31) but  $E_x$  not redetermined.
- <sup>h</sup> Analysis of the two bound states is done using DWUCK. For the unbound states DOXY was used. For values of  $\Gamma_n/\Gamma_{\text{s.p.}}$  under various assumptions see (1975GO31).
- <sup>i</sup> Broad or unresolved states.
- <sup>j</sup>  $S = 0.88$  (1975GO31).
- <sup>k</sup>  $S = 0.69$  or  $0.55$  (1975GO31).
- <sup>l</sup> Sum of the  $J$  for these two states is 2 [based on  $(2J_f + 1)$  dependence of cross section] (1974GA33).
- <sup>m</sup> Observed by (1975CE04):  $E_d = 27$  MeV who also report proton groups to  ${}^{15}\text{C}^*(0, 0.74, 4.22, 6.43, 6.88, 7.35)$ .