

$^7\text{Li}(^9\text{Be},\alpha^9\text{Be}), ^{14}\text{C}(^{13}\text{C},\alpha^9\text{Be})$

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, C. G. Sheu and J. E. Purcell		NDS 198,1 (2024)	1-Aug-2024

[2003So24](#), [2004So19](#), [2004So35](#): $^7\text{Li}(^9\text{Be},\alpha^9\text{Be})$ E=70 MeV at the ANU accelerator facility in Canberra. Measured $E_{\text{rel}}(\alpha+^9\text{Be})$ spectrum using four strip detector telescopes. Deduced resonance energies, cluster structure.

[2006Pr01](#): $^{14}\text{C}(^{13}\text{C}, ^{13}\text{C}' \rightarrow \alpha^9\text{Be})$ E=77.8, 112.25, 119.25 MeV at the Vivitron facility in Strasbourg. Measured $E_{\text{rel}}(\alpha+^9\text{Be})$ spectrum using two strip detector telescopes at $\theta=(+)21.2^\circ$ and $\theta=(-)17.4^\circ$. Deduced excited state energies, $\sigma(E_x, \theta)$ for $\theta \approx 5^\circ - 25^\circ$, J, π , α -decay features, α -cluster structure. Compared with earlier results.

Theory:

[2003Fr38](#): $^7\text{Li}(^9\text{Be},\alpha^9\text{Be})$ E=70 MeV; analyzed excitation energy spectra. Deduced level energies, cluster structure.

[2007Pe26](#): ^{13}C ; calculated α -decay and cluster decay widths; deduced Γ . Self-consistent mean-field model, folding form cluster potential.

[2008Yo10](#): ^{13}C ; calculated low-lying negative parity state energies, J, π , B(E0); deduced α -breaking effect. Microscopic cluster model.

 ^{13}C Levels

E(level) [†]	J π [@]	Γ [#]	Comments
12.0×10^3	$5/2^+$		
13.2×10^3 [‡] 1	$(9/2)^-$		E(level): See also (2003So24 , 2004So19 , 2004So35 : $E_x=13400$ keV).
13.6×10^3 [‡] 2	$7/2^-$		
14.2×10^3 [‡] 1	$3/2^-$		E(level): See also (2003So24 , 2004So19 , 2004So35 : $E_x=14100$ keV). J^π : Measurements of (2006Pr01) suggest $5/2^+$.
14.6×10^3	$(7/2^+, 9/2^+)$		
15.0×10^3 [‡] 1	$(7/2^-)$		
15.2×10^3 [?]	$9/2^+$		
16.0×10^3 [‡] 1	$(7/2^+, 5/2^-)$		E(level): See also (2003So24 , 2004So19 , 2004So35 : $E_x=(16000)$ keV). J^π : Measurements of (2006Pr01) suggest positive parity.
16.8×10^3		310 keV	
17.9×10^3 [?]			
18.7×10^3	$(3/2^+, 5/2^+)$	570 keV	
21.3×10^3		530 keV	
23.9×10^3		1100 keV	
27.3×10^3 [?]			

[†] From $^7\text{Li}(^9\text{Be}, ^9\text{Be}+\alpha)$ ([2003So24](#),[2004So19](#),[2004So35](#)) except where noted; ^{13}C states are α -decaying to $^9\text{Be}_{\text{g.s.}}$ ($E_{\text{thres.}}=10.648$ MeV).

[‡] From $^{14}\text{C}(^{13}\text{C}, ^9\text{Be}+\alpha)$ ([2006Pr01](#)).

[#] From ([2003So24](#)).

[@] From α -cluster configuration analysis in ([2006Pr01](#)); mainly from Adopted Levels ([1991Aj01](#)), except where noted.