

$^9\text{Be}(^{13}\text{O}, 2\text{p}+^9\text{C})$ 2019We03

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. G. Sheu, J. H. Kelley	ENSDF	29-April-2019

The authors analysed the relative energy spectrum of $2\text{p}+^9\text{C}$ products following 2-neutron knockout reactions from ^{13}O ions. First evidence of any ^{11}O resonances is reported.

A beam of 69.5 MeV/nucleon ^{13}O ions, from the NSCL/A1900 fragment separator, was purified in the Radio Frequency Fragment Separator before impinging on a 1 mm thick ^9Be target. The reaction products were detected using the HiRA High-Resolution position sensitive ΔE -E telescope array, which covered the polar angles $\theta_{\text{lab}}=2.1^\circ$ to 12.1° . A broad peak near $E_{\text{res}}(2\text{p}+^9\text{C})\approx 4.5$ MeV was observed in the total energy spectrum. The peak included contributions from $2\text{p}+^9\text{C}$, $2\text{p}+^{10}\text{C}$ and $2\text{p}+^{11}\text{C}$; however the $2\text{p}+^{10}\text{C}(^{12}\text{O})$ and $2\text{p}+^{11}\text{C}(^{13}\text{O})$ components were estimated and subtracted.

A rigorous theoretical analysis of the resulting spectrum was carried out that included a comparison with the mirror ^{11}Li system. The authors found a reasonable fit to their spectrum by assuming the broad peak they observed could be associated with a collection of four unresolved $J^\pi=3/2^-$ and $5/2^+$ states.

 ^{11}O Levels

<u>E(level)^{†‡}</u>	<u>J^π[†]</u>	<u>Γ (MeV)[†]</u>	<u>$E_{\text{rel.}}(2\text{p}+^9\text{C})$ (MeV)</u>	<u>Comments</u>
0	(3/2 ⁻)	1.30 MeV	4.16	%2p≈100 E(level): (2019We03) observe a peak near $E_{\text{res}}(2\text{p}+^9\text{C})\approx 4.5$ MeV that is reasonably explained using a four resonance fit. The fit, which is guided by theory, is found to be favorable but not uniquely constrained.
0.49×10^3	(5/2 ⁺)	1.06 MeV	4.65	%2p≈100
0.69×10^3	(3/2 ⁻)	1.33 MeV	4.85	%2p≈100
2.12×10^3	(5/2 ⁺)	1.96 MeV	6.28	%2p≈100

[†] From analysis and comparison with ^{11}Li .

[‡] E.g.s. from $E_{\text{res}}(2\text{p}+^9\text{C})=4.16$ MeV.